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The contents of this Value Engineering Report are intended to convey the results of a peer-review of the Early Preliminary Engineering (EPE) cost estimates to date and to provide confidence to MDOT that the costs shown in the Draft Environmental Impact Statement and subsequent reports are consistant and reflect the intent of the design.

The DEIS was developed in Metric units which were converted to Customary English Units by the value engineering study.

Executive Summary

The Michigan Department of Transportation (MDOT) proposes to improve 6.7 miles of I-94 in the City of Detroit. The improvement begins east of the I-94/I-96 interchange, includes the I-94/M-10 and I-94/I-75 interchanges and ends east of the I-94/Conner Ave. interchange. A Draft Environmental Impact Study (DEIS) was completed in January 2001, and the Final EIS is in preparation.

A Value Engineering (VE) study of the DEIS focused on the DEIS Build Alternative and was conducted in March 2004. An Executive Summary report and a full report were made in May 2004. The cost of the Build Alternative from the VE study was estimated to be $979 million (all costs are given in 2001 dollars). The support documents for this estimated cost are shown in Appendix D, of this report.

MDOT later requested a comparable VE study of the DEIS Enhanced No-Build Alternative cost estimate in the same detail as the DEIS Build Alternative. This report presents the findings of that study. The cost of the DEIS Enhanced No-Build Alternative was estimated in the DEIS to be $738 million. The support documents for that estimated cost are shown in Appendix A. The VE study reviewed all elements and estimated the cost for the Enhanced No-Build to be $444 million.

Section 1 of this report shows the DEIS cost estimates for the Build and Enhanced No-Build Alternatives. Section 2 reviews the DEIS Enhanced No-Build and describes the reasons for the differences between the DEIS and VE Alternative cost estimates. Section 3 compares seven scenarios; five No-Builds, one Enhanced No-Build and one Build. This comparison illustrates the range of project improvements and costs.

Scenarios 1 through 5 are limited to maintaining the existing system and are considered maintenance contracts. They have a range of cost with a maximum of $617 million. Scenarios 3 through 5 reduce future maintenance costs by reconstructing the existing mainline and ramp pavements. Scenario 3 also replaces only the bridge superstructures while Scenario 4 replaces the total structures in-kind.

The costs of the VE Enhanced No-Build Alternative is $743 million (Scenario 6). Scenario 6 improves safety and capacity by widening shoulders, lengthening ramp tapers and replacing the bridges over I-94 to accommodate the widened shoulders and tapers.

The VE Build Alternative is shown as Scenario 7. In this scenario, an additional lane in each direction is accommodated and the interchanges are reconstructed. Scenario 7 fully satisfies safety and capacity and also addresses the needs of the community. The cost estimate for Scenario 7 is $1.012 billion. The support documents for this estimate are shown in Appendix E. This cost differs from the May 2004 VE Build Alternative ($979 million) because of the addition of ITS ($22 million), national security costs ($9 million) and additional engineering ($2 million).

The cost of the VE Build Alternative in 2004 dollars is estimated to be $1,172 million ($1.172 billion).

1.0 Introduction

1.1 Description of Project Area

The Michigan Department of Transportation (MDOT) proposes a project to reconstruct 6.7 miles of I-94 in the City of Detroit. The project begins just east of the I-94/I-96 interchange, includes the I-94/M-10 and I-94/I-75 system interchanges and ends just east of the I-94/Conner Avenue interchange. The project scope includes: the construction of an additional lane in each direction along I-94 (total of four through lanes in each direction); the reconstruction of the two system interchanges; reconstruction of various full-service interchanges; the removal and/or replacement of a number of pedestrian, railroad and vehicle bridges; and the construction of continuous service drives along the corridor and through the interchanges.

1.2 Purpose and Need

The primary purpose of the Interstate 94 (I-94) Rehabilitation Project is to replace the existing pavement, replace the aging bridges, provide additional capacity to meet 20 year projections, improve safety, replace the aged drainage system, and improve traffic operations in a 6.7-mile segment of I-94 in the City of Detroit. Proposed improvements will also enhance local traffic circulation, improve community access, address environmental concerns, support economic growth, and contribute positively to the surrounding neighborhoods.

1.3 Description of No-Build Alternative

The DEIS No-Build Alternative proposed continued maintenance of bridges and roadways until such time as they approached the end of their service life. At that point, they would be replaced in their existing configuration. The DEIS No-Build Alternative does not address current operational or safety problems, modernize the design of the existing facility, or provide for capacity increases to meet current and future traffic volumes. In addition, the No-Build alternative does not address the local traffic circulation, community access, environmental, economic and neighborhood issues.

1.4 Description of Enhanced No-Build Alternative

The DEIS Enhanced No-Build Alternative proposed reconstruction of the existing freeway to provide new pavement, bridges, and limited improvements to shoulders and ramps to duplicate the existing freeway. It would also add auxiliary, acceleration, and deceleration lanes where possible, within existing rights-of-way. The two major freeway/freeway interchanges would also be reconstructed in their current configuration. It does not provide for any increases in capacity. This alternative does not address the local traffic circulation, community access, environmental, economic, and neighborhood issues.

The Cost Estimate for the DEIS Enhanced No-Build is shown as Figure A.1 in Appendix A. This estimate is given by segment of the project as indicated below.

Segment A - I-94; from I-96 to west of Cass Street
Segment B - I-94; from west of Cass Street to east of Grand Trunk RR.
Segment C - I-94; from east of Grand Trunk RR to Conner Street
Segment D - M-10; from Gladstone Street to Willis Street
Segment E - I-75; from Philadelphia Street to Wallick Street

Figure A.2 in Appendix A is the same cost estimate but given by Item as presented in the DEIS.

1.5 Description of the Build Alternative

The DEIS Build Alternative proposed to reconstruct I-94 providing an all new facility with an additional general purpose driving lane in each direction,new state-of-the-art geometric designs for all interchanges, the addition of auxiliary and acceleration/deceleration lanes and one-way continuous service drives with sidewalks. This would eliminate all left-off/left-on ramps to fully address existing safety and operational problems. The continuous service drives would provide improved local circulation along and across I-94, and also provide better access to adjoining businesses, residences, and other local destinations. The service drives would consist of two eleven foot through lanes and an eight foot multi-purpose lane. This alternative also addresses economic, environmental, and neighborhood issues.

The Cost Estimate for the DEIS Build Alternative is shown in Exhibit 1.1. The detailed cost estimate is shown in Appendix C.

1.6 Comparison of DEIS Build Alternative and DEIS Enhanced No-Build Costs

Exhibit 1.1 shows a summary comparison of the DEIS Build Alternative and the DEIS Enhanced No-Build costs by item.

Summary of DEIS Alternatives

Items (per DEIS)	DEIS Build	DEIS Enhanced No Build
Asphalt Pavement (Miscellaneous)	$3,898,000	$5,224,939
Concrete Pavement	$69,308,000	$36,812,946
Mill and Overlay	$616,000	0
Removal of Surfacing	$2,121,000	0
Curb and Gutter	$1,577,000	$4,799,515
Sidewalk	$1,327,000	$2,517,959
Concrete Median Pavement	$441,000	0
Bridges	$141,023,000	$132,452,749
Retaining Walls	$20,587,000	$108,489,747
Removal of Structures	$19,876,000	$35,948,011
Signals	$5,200,000	$690,000
Lighting	$10,000,000	$1,395,940
Signing	$13,000,000	$133,763
Striping	$241,000	$334,047
RR Crossing	$400,000	0
Drainage	$22,219,000	0
Pump Stations	$12,000,000	$2,025,000
Concrete Wall Barrier	$13,500,000	$4,665,648
Landscaping	$8,000,000	$53,500
Subtotal Cost	**$345,334,000**	**$335,543,764**
Utilities (15%)	$51,800,000	$27,865,254
Traffic Control (15%)	$59,570,000	$69,428,973
Contingency (25%)	$114,176,000	$77,143,304
Mobilization (10%)	$57,088,000	$58,176,831
Enhancement (10%)	$62,797,000	0
ITS	0	$22,307,500
Subtotal Cost	**$690,765,000**	**$590,465,626**
Engineering (25%)	$172,691,000	$147,616,407
Right-of-Way	$50,000,000	0
Grand Total ($2001)	**$913,456,000**	**$738,082,033**

Exhibit 1.1

Based on the amounts shown above, the cost difference between a totally rebuilt and widened I-94 that meets current standards and includes continuous service drives is $175,373,967 more than the existing I-94 with new pavement that retains current non-standard horizontal and vertical geometry.

VE of Enhanced No-Build Alternative

2.0 Cost Estimate of Enhanced No-Build Alternative

There are discrepancies in the DEIS cost estimate for the Enhanced No-Build Alternative. They can be classified in the following categories:

- Arithmetical error
- Quantity error
- Item not included in both Enhanced No-Build and Build Alternatives
- Reasons for the cost are not known
- Inconsistent unit price
- Activity not in the defined scope

Items (per DEIS)	DEIS Enhanced No-Build	Enhanced No-Build (Revised by VE)
Asphalt Pavement (Miscellaneous)	$5,224,939	$5,224,939
Concrete Pavement	$36,812,946	$36,812,946
Mill and Overlay	$0	$0
Removal of Surfacing	$0	$0
Curb and Gutter	***$4,799,515***	***$1,791,738***
Sidewalk	$2,517,959	$2,517,959
Concrete Median Pavement	$0	$0
Bridges	***$132,452,749***	***$90,345,535***
Retaining Walls	***$108,489,747***	***$32,300,000***
Removal of Structures	***$35,948,011***	***$20,575,420***
Signals	$690,000	$690,000
Lighting	$1,395,940	$1,395,940
Signing	$133,763	$133,763
Striping	$334,047	$334,047
RR Crossings	$0	$0
Drainage	$0	$0
Pump Stations	$2,025,000	$2,025,000
Concrete Wall Barrier	$4,665,648	$4,665,648
Landscaping	$53,500	$53,500
Subtotal Cost	$335,543,764	$198,866,425
Utilities	$27,865,254	$30,975,435
Traffic Control	$69,428,973	$30,975,435
Contingency	$77,143,304	$51,625,725
Mobilization	$58,176,831	$20,650,290
Enhancement	$0	$0
ITS	$22,307,500	$22,307,500
Subtotal Cost	$590,465,626	$355,400,820
Engineering (25%)	$147,616,407	$88,850,205
Right-of-Way	$0	$0
Grand Total ($2001)	$738,082,033	$444,251,025

Exhibit 2.1
VE of Enhanced No-Build Alternative

Exhibit 2.1 shows a comparison summary, by Item, of the DEIS Cost Estimate vs. the Revised by this Value Engineering Study. The items shown in bold-italics in Exhibit 2.1 are items where discrepancies were noted and are discussed in detail below. The DEIS Enhanced No-Build Cost Estimate is $738,082,033 - $444,251,025 = $293,831,008 more than the Revised Enhanced No-Build cost.

Following is a brief description of the items shown in bold-italics making up the difference between the two estimates.

2.1 Curb and Gutter

This VE assumes that there is no curb & gutter replacement on the few sections of the service drive. All replacements are on the mainline. Note that in the Build Alternative, curb and gutter construction is on the service drives and portions of the ramps only. The DEIS Cost Estimate contained discrepancies in the unit price for Removal and Replacement of Curb and Gutter (Exhibit 2.2a). Note the Segment B utilized $38/m and the remainder of the segments used

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Curb & Gutter - Removal and Replacement							
A							
-- Curb & Gutter (EB)	2664		200%	m	5328	$72	$382,550
-- Curb & Gutter (WB)	2664		200%	m	5328	$72	$382,550
B							
-- Curb & Gutter (EB)	2396		200%	m	4792	$38	$181,138
-- Curb & Gutter (WB)	2396		200%	m	4792	$38	$181,138
C							
-- Curb & Gutter (EB)	6206		200%	m	12412	$71	$891,182
-- Curb & Gutter (WB)	6206		200%	m	12412	$71	$891,182
M10							
-- Curb & Gutter (SB)	3490		200%	m	6980	$71	$501,164
-- Curb & Gutter (NB)	3490		200%	m	6980	$71	$501,164
I-75							
-- Curb & Gutter (SB)	3090		200%	m	6180	$71	$443,724
-- Curb & Gutter (NB)	3090		200%	m	6180	$71	$443,724
Curb & Gutter							**$4,799,515**

Exhibit 2.2a
As-Given Computation for DEIS

$71/m. In addition, the unit price for Removal and Replacement of Curb & Gutter was different for the DEIS Build ($7.65/lf, $25.08/m) and Enhanced No-Build ($11.52/lf, $37.80/m) Alternatives.

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Curb & Gutter - Removal and Replacement							
A							
-- Curb & Gutter (EB)	2664		200%	m	5328	$25	$133,733
-- Curb & Gutter (WB)	2664		200%	m	5328	$25	$133,733
B							
-- Curb & Gutter (EB)	2396		200%	m	4792	$25	$120,279
-- Curb & Gutter (WB)	2396		200%	m	4792	$25	$120,279
C							
-- Curb & Gutter (EB)	6206		200%	m	12412	$25	$311,541
-- Curb & Gutter (WB)	6206		200%	m	12412	$25	$311,541
M10							
-- Curb & Gutter (SB)	3490		200%	m	6980	$25	$175,198
-- Curb & Gutter (NB)	3490		200%	m	6980	$25	$175,198
I-75							
-- Curb & Gutter (SB)	3090		200%	m	6180	$25	$155,118
-- Curb & Gutter (NB)	3090		200%	m	6180	$25	$155,118
Curb & Gutter							**$1,791,738**

Exhibit 2.2b
Revised Computation by VE Study

Correcting these unit prices (Exhibit 2.2b) resulted in a reduction of $4,799,515 - $1,791,738 = $3,007,777 in the cost of Curb & Gutter for the DEIS Enhanced No-Build.

2.2 Bridges

In the Enhanced No-Build Alternative all bridges will be replaced in-kind, including ramp bridges for the M-10 and I-75 interchanges and crossroads. Quantities for these bridges were checked against MDOT Report 44 (Bridge Inventory).

The bridge cost estimate for the DEIS Enhanced No-Build (Exhibit 2.3a) used an incorrect unit price for the repairs to the substructure of bridges in Segment B.

The DEIS Enhanced No-Build had an incorrect structure width for the bridge carrying Grand River Avenue over I-94.

The DEIS Enhanced No-Build included the replacement of a part of I-94 known as the Dequindre structure. This structure was rebuilt in 1999 and should not need to be replaced at this time.

These items are indicated (shaded) on Exhibit 2.3a.

As shown in Exhibit 2.3b, correcting these DEIS values resulted in a reduction of $132,452,744 - $90,345,535 = $42,107,209 in the cost of bridges.

2.3 Retaining Walls

In the Enhanced No-Build cost, the height of the walls is assumed to be 6.1m (20'±) everywhere except one segment where it is assumed to be 20m (66'±); this seems to be an error. Using a value of 6.1m throughout, the cost will be reduced by $41 million.

Retaining walls are needed for the DEIS Build Alternative since the roadway is widened from six lanes to eight lanes. In the Enhanced No-Build, the roadway will be rebuilt with little change in profile or alignment and few rebuilt or new retaining walls will be required. However, the Enhanced No-Build will include auxiliary lanes and longer acceleration/deceleration lanes for ramps. For the build alternatives the cost f the wall was estimated at $64.6 million. For the enhanced no-build alternative it was assumed that no more then 50 percent of the full build alternative would be required or $32.3 million.

2.4 Removal of Structures

The cost estimate for the DEIS Enhanced No-Build (Exhibit 2.4a) double counted the cost for removal of the bridge carrying Chene Road over I-94.

The DEIS Enhanced No-Build also included the cost for removal of the Dequindre structure. This structure was rebuilt in 1999 and should not need to be replaced at this time.

The VE study cost validation for Removal of Structures is shown in Exhibit 2.4b. Making the above correction and those noted on Exhibit 2.4a and 2.4b resulted in a reduction of $35,948,011 - $20,575,420 = $15,372,591 in the Cost of Removal of Structures.

DEIS Enhanced No-Build

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Replacement Bridges							
-- Grand River							
Superstructure	110	3		m^2	330	860	$283,800
Substructure				LSUM		32	$10,560
-- Linwood Ave.							
Superstructure	53	19		m^2	1007	860	$866,020
Substructure				LSUM		32	$26,010
-- 14th Street							
Superstructure	53	25		m^2	1325	860	$1,139,500
Substructure				LSUM		32	$24,825
-- Rosa Parks Blvd							
Superstructure	79	15		m^2	1185	860	$1,019,100
Substructure				LSUM		32	$39,000
-- Trumbull							
Superstructure	67	15		m^2	1005	860	$864,300
Substructure				LSUM		32	$33,000
-- Third Street							
Superstructure	134	12		m^2	1608	860	$1,382,880
Substructure				LSUM		32	$88,440
-- Second Ave.							
Superstructure	65	25		m^2	1625	860	$1,397,500
Substructure				LSUM		32	$42,915
I-94 Mainline Bridges							
N/A							
Subtotal							**$7,217,850**
B- Pedestrian Bridges							
-- WSU Athletic Field	128	3		m^2	460	323	$148,838
Railroad Bridges							
-- GTW/Conrail							
Superstructure	110	10		m^2	1177	1722	$2,026,794
Substructure						64	$76,034
Vehicular Bridges (X-overs)							
-- Cass Ave.							
Superstructure	58	24		m^2	1415	861	$1,218,487
Substructure				LSUM		4	$5,661
-- Woodward Ave.							
Superstructure	73	24		m^2	1786	861	$1,537,815
Substructure				LSUM		4	$7,144
-- John R.							
Superstructure	52	18		m^2	990	861	$852,700
Substructure				LSUM		4	$3,961
-- Brush							
Superstructure	52	18		m^2	986	861	$849,445
Substructure				LSUM		4	$3,946
-- Beaubien							
Superstructure	53	18		m^2	1001	861	$862,464
Substructure				LSUM		4	$4,007
I-94 Dequindre Bridge							
Superstructure	823	36		m^2	30121	861	$25,934,870
Substructure				LSUM		4	$120,487
Pedestrian Bridges							
N/A							
Subtotal							**$33,652,654**
Railroad Bridges							
N/A							
C- Vehicular Bridges (X-overs)							
-- Chene							
Superstructure	51	20		m^2	1072	860	$922,144
Substructure				LSUM		32	$34,312
-- E. Grand Blvd.							
Superstructure	49	40		m^2	1998	860	$1,718,228
Substructure				LSUM		32	$63,934
-- Lucky St.							
Superstructure	54	12		m^2	670	860	$576,011
Substructure				LSUM		32	$21,433
-- Saginaw							
Superstructure	48	24		m^2	1191	860	$1,024,019
Substructure				LSUM		32	$38,103
-- Mt. Elliot							
Superstructure	51	20		m^2	1066	860	$916,803
Substructure				LSUM		32	$34,114
-- Harper							
Superstructure	51	12		m^2	632	860	$543,486
Substructure				LSUM		32	$20,223
-- Concord							
Superstructure	51	20		m^2	1060	860	$911,462
Substructure				LSUM		32	$33,915
-- Frontenac							
Superstructure	51	18		m^2	968	860	$832,205
Substructure				LSUM		32	$30,966
-- Van Dyke							
Superstructure	50	29		m^2	1491	860	$1,282,578
Substructure				LSUM		32	$47,724
-- Burns							
Superstructure	50	18		m^2	958	860	$824,078
Substructure				LSUM		32	$30,663
-- McClellan							
Superstructure	68	17		m^2	1209	860	$1,039,663
Substructure				LSUM		32	$38,685
-- Gratiot							
Superstructure	115	30		m^2	3532	860	$3,037,434
Substructure				LSUM		32	$113,021
-- Cadillac							
Superstructure	56	20		m^2	1159	860	$996,912
Substructure				LSUM		32	$37,094
-- French Rd.							
Superstructure	52	18		m^2	983	860	$845,208
Substructure				LSUM		32	$31,450
-- Conner							
Superstructure	42	18		m^2	781	860	$672,013
Substructure				LSUM		32	$42,210
-- West Conner Bridge							
Superstructure	51	15		m^2	787	860	$677,130
Substructure				LSUM		32	$25,196
-- East Conner Bridge							
Superstructure	67	15		m^2	1018	860	$875,824
Substructure				LSUM		32	$32,589
I-94 Mainline Bridges							
-- Conrail RR (Mt. Elliot)							
Superstructure	103	48		m^2	5056	860	$4,347,885
Substructure				LSUM		32	$161,782
-- Conrail RR (Conner)							
Superstructure	115	30		m^2	3532	860	$3,037,434
Substructure				LSUM		32	$113,021
Subtotal							**$26,030,949**
Pedestrian Bridges							
N/A							
Railroad Bridges							
N/A							
M-10 Vehicular Bridges (X-overs)							
-- Euclid							
Superstructure	60	21		m^2	1260	860	$1,083,600
Substructure				LSUM		32	$40,320
-- Seward							
Superstructure	60	21		m^2	1260	860	$1,083,600
Substructure				LSUM		32	$40,320

= Items noted by VE Study as discrepancies

Exhibit 2.3a
DEIS Enhanced No-Build Alternative
Bridges

2.0 Cost Estimate of Enhanced No-Build Alternative

2.0 Cost Estimate of Enhanced No-Build Alternative

DEIS Enhanced No-Build

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
-- Pallister							
Superstructure	60	10		m^2	600	860	$516,000
Substructure				LSUM		32	$19,200
-- West Grand							
Superstructure	50	38		m^2	1900	860	$1,634,000
Substructure				LSUM		32	$60,800
-- Milwaukee							
Superstructure	55	14		m^2	770	860	$662,200
Substructure				LSUM		32	$24,640
-- Warren							
Superstructure	60	35		m^2	2100	860	$1,806,000
Substructure				LSUM		32	$67,200
-- Forrest							
Superstructure	60	16		m^2	960	860	$825,600
Substructure				LSUM		32	$30,720
I-94 Mainline Bridges							
-- SB M-10 / I-94							
Superstructure	400	18		m^2	7200	860	$6,192,000
Substructure				LSUM		32	$230,400
-- NB M-10 / I-94							
Superstructure	400	18		m^2	7200	860	$6,192,000
Substructure				LSUM		32	$230,400
Pedestrian Bridges							
-- Holden							
Superstructure	80	3		m^2	288	860	$247,680
Substructure				LSUM		32	$9,216
-- Wayne State							
Superstructure	140	3		m^2	504	860	$433,440
Substructure				LSUM		32	$16,128
-- Canfield							
Superstructure	85	3		m^2	306	860	$263,160
Substructure				LSUM		32	$9,792
Railroad Bridges							
-- Grand Trunk Western - North							
Superstructure	300	12		m^2	3660	860	$3,147,600
Substructure				LSUM		32	$117,120
-- Grand Trunk Western - South							
Superstructure	300	12		m^2	3660	860	$3,147,600
Substructure				LSUM		32	$117,120
Subtotal							**$26,247,856**
I-75 Vehicular Bridges							
-- Clay							
Superstructure	70	30		m^2	2100	860	$1,806,000
Substructure				LSUM		32	$67,200
-- West Grand							
Superstructure	100	30		m^2	3000	860	$2,580,000
Substructure				LSUM		32	$96,000
-- Milwaukee							
Superstructure	75	18		m^2	1350	860	$1,161,000
Substructure				LSUM		32	$43,200
-- Ferry							
Superstructure	135	18		m^2	2430	860	$2,089,800
Substructure				LSUM		32	$77,760
-- Warren							
Superstructure	75	50		m^2	3750	860	$3,225,000
Substructure				LSUM		32	$120,000
-- Canfield							
Superstructure	75	18		m^2	1350	860	$1,161,000
Substructure				LSUM		32	$43,200
-- SB Ramp to Warren							
Superstructure	50	9		m^2	460	860	$395,600
Substructure				LSUM		32	$14,720
-- NB Ramp from Warren							
Superstructure	70	9		m^2	644	860	$553,840
Substructure				LSUM		32	$20,608
-- WB I-94 to SB I-75							
Superstructure	320	13		m^2	4256	860	$3,660,160
Substructure				LSUM		32	$136,192
-- EB I-94 to NB I-75							
Superstructure	125	9		m^2	1150	860	$989,000
Substructure				LSUM		32	$36,800
-- NB I-75 to WB I-94							
Superstructure	275	9		m^2	2530	860	$2,175,800
Substructure				LSUM		32	$80,960
-- SB I-75 to EB I-94							
Superstructure	200	9		m^2	1840	860	$1,582,400
Substructure				LSUM		32	$58,880
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
N/A							
Railroad Bridges							
-- Grand Trunk Western Spur - North							
Superstructure	80	12		m^2	960	860	$825,600
Substructure				LSUM		32	$30,720
-- Grand Trunk Western Spur - South							
Superstructure	200	80	18	m^2	16000	860	$13,760,000
Substructure				LSUM		32	$512,000
Replacement Bridges							**$132,452,749**

Exhibit 2.3a (cont.)
DEIS Enhanced No-Build Alternative
Bridges

Enhanced No-Build Bridge Cost Validation

		Construction				
		Length	Width	Area	Unit Cost	Total
A	Grand River	251	100	25,100	$80	$2,008,000
	Linwood	173	62	10,726	$80	$858,080
	14th st	166	80	13,280	$80	$1,062,400
	GT Western Conrail (W) over I-94	174	70	12,180	$465	$5,663,700
	GT Western Conrail (E) over I-94	174	40	6,960	$465	$3,236,400
	Rosa Parks	120	50	6,000	$80	$480,000
	Trumbull	210	88	18,480	$80	$1,478,400
	Third Ave.	421	70	29,470	$80	$2,357,600
	Second Ave.	214	80	17,120	$80	$1,369,600
D						
	I-94 WB to M-10 SB -S26 (West to South) -S26	1158	45	52,110	$120	$6,253,200
	M-10 SB over M-10 NB to I-94 WB -S22	232	60	13,920	$120	$1,670,400
	M-10 NB (Mainline) -S27	297	50	14,850	$100	$1,485,000
	M-10 SB (Mainline) -S24	297	50	14,850	$100	$1,485,000
	M-10 NB over M-10 SB to I-94 EB -S29	224	55	12,320	$120	$1,478,400
	I-94 EB to M-10 NB (East to North) -S25	1134	45	51,030	$120	$6,123,600
	I-94 EB over I-94 EB to M-10 SB (East) -S23	186	55	10,230	$120	$1,227,600
	I-94 WB over M-10 SB to I-94 EB -S28	196	55	10,780	$120	$1,293,600
B	Cass	190	80	15,200	$80	$1,216,000
	Woodward	237	125	29,625	$80	$2,370,000
	John R	172	60	10,320	$80	$825,600
	Brush	171	50	8,550	$80	$684,000
	Beaubien	174	60	10,440	$80	$835,200
E	I75/I94 -S27	188	130	24,440	$100	$2,444,000
	I-75 SB to I-94 WB -S28	153	45	6,885	$200	$1,377,000
	I-94 WB to I-75 SB -S24	309	40	12,360	$120	$1,483,200
	I-75 SB over I-75 and I-94 -S30	827	34	28,118	$120	$3,374,160
	94W to 75S (West to South) over I-75 -S29	186	35	6,510	$120	$781,200
	94E to 75N (East to North) -S26	585	35	20,475	$120	$2,457,000
	NBD I-75 to WBD I-94 -S25	772	35	27,020	$120	$3,242,400
	I-94 EB Ent ramp -S21	172	30	5,160	$200	$1,032,000
	I-94 EB to I-75 NB -S23	307	30	9,210	$120	$1,105,200
	I-94 WB to I-75 S over I-94 E to I-75 N -S22	165	45	7,425	$120	$891,000
C	E. Grand Braided Ramp	183	30	5,490	$80	$439,200
	Chene	170	65	11,050	$80	$884,000
	E. Grand	186	120	22,320	$80	$1,785,600
	Lucky Place	174	45	7,830	$80	$626,400
	Saginaw U Turn	161	60	9,660	$80	$772,800
	M. Elliott	169	70	11,830	$80	$946,400
	Harper EB	171	40	6,840	$80	$547,200
	Conrail RR	120	50	6,000	$465	$2,790,000
	Concord	168	65	10,920	$80	$873,600
	Helen Ped	171	12	2,052	$80	$164,160
	Frontenac	168	60	10,080	$80	$806,400
	Townsend Ped	194	10	1,940	$80	$155,200
	Van Dyke	167	100	16,700	$80	$1,336,000
	Seminole Ped	218	10	2,180	$80	$174,400
	Burns	167	65	10,855	$80	$868,400
	Rohns Ped	159	12	1,908	$80	$152,640
	McClellan	224	55	12,320	$80	$985,600
	Gratiot	284	120	34,080	$80	$2,726,400
	Cadillac	185	70	12,950	$80	$1,036,000
	French	171	60	10,260	$80	$820,800
	Springfield Ped	197	10	1,970	$80	$157,600
	Conrail RR	127	50	6,350	$465	$2,952,750
	Conrail RR (Spur)	125	25	3,125	$465	$1,453,125
	Conner	150	173	25,950	$80	$2,076,000
	West Conner	220	60	13,200		$0
	East Conner	171	60	10,260		$0
	Malcolm Ped	217	12	2,604	$80	$208,320
	Barrett	171	70	11,970	$80	$957,600
	Totals					**$90,345,535**
	Widen/Rebuild Dequindre (I-94)	0	0	0	$0	$0

Unit prices for structure replacement

Cross road bridges	$80
Mainline over Mainline	$100
Interstate bridges	$120
Braided Ramps	$200
Dequindre	$150
Railroad	$465

RR cost is limited to replacement cost

No modification to the Dequindre bridge is expected since it has already been improved to the current freeway standards in the late 1990's.

= Items corrected in VE Study from Exhibit 2.3a (DEIS)

Exhibit 2.3b
Enhanced No-Build Alternative-Revised in VE Study
Bridges

VE of Enhanced No-Build Alternative

2.0 Cost Estimate of Enhanced No-Build Alternative

2.0 Cost Estimate of Enhanced No-Build Alternative

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Structure Removals							
-- Grand River	110	30		m^2	3300	248	818400
-- Linwood Ave.	53	19		m^2	1007	248	249736
-- 14th Street	53	25		m^2	1325	248	328600
-- Rosa Parks Blvd.	79	15		m^2	1185	248	293880
-- Trumbull	67	15		m^2	1005	248	249240
-- Third Street	134	12		m^2	1608	248	398784
-- Second Ave.	65	25		m^2	1625	248	403000
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
-- WSU Athletic Field	128	3		m^2	460	140	64512
Railroad Bridges							
-- GTW/Conrail	110	24		m^2	2684	495	1328580
Railroad Bridges Cont'd							
-- RR Spur (Rosa Parks)	55	18		m^2	990	495	490050
-- Cass Ave.	58	24		m^2	1415	248	350970
-- Woodward Ave.	73	24		m^2	1786	248	442948
-- John R.	52	19		m^2	995	248	246909
-- Brush	52	19		m^2	991	248	245966
-- Beaubien	53	19		m^2	1007	248	249736
-- Chene	51	20		m^2	1072	248	265920
I-94 Dequindre Bridge	823	36		m^2	30121	248	7470207
Pedestrian Bridges							
N/A							
Railroad Bridges							
N/A							
-- Chene	51	20		m^2	1072	248	265920
-- E. Grand Blvd.	49	40		m^2	1998	248	495489
-- Lucky St.	54	12		m^2	670	248	166105
-- Saginaw	48	24		m^2	1191	248	295299
-- Mt. Elliot	51	20		m^2	1066	248	264380
-- Harper	51	12		m^2	632	248	156726
-- Concord	51	20		m^2	1060	248	262840
-- Frontenac	51	18		m^2	968	248	239985
-- Van Dyke	50	29		m^2	1491	248	369860
-- Burns	50	18		m^2	958	248	237641
-- McClellan	68	17		m^2	1209	248	299810
-- Gratiot	115	30		m^2	3532	248	875911
-- Cadillac	56	20		m^2	1167	248	289535
-- French Rd.	52	18		m^2	985	248	244203
-- Conner	42	18		m^2	781	248	193790
* West Bridge	51	15		m^2	787	248	195265
* East Bridge	67	15		m^2	1018	248	252563
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
-- Helen	52	3		m^2	190	140	26623
-- Townsend	57	3		m^2	211	140	29587
-- Seminole	67	3		m^2	245	140	34288
-- Rohns	54	3		m^2	200	140	28054
-- Garland	58	4		m^2	251	140	35151
-- Springfield	58	3		m^2	212	140	29740
-- Malcolm	67	3		m^2	245	140	34288

Duplicate

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Railroad Bridges							
-- Conrail RR (Mt. Elliot)	103	48		m^2	5056	248	1253809
-- Conrail RR (Conner)	115	30		m^2	3532	248	875911
Vehicular Bridges (X-overs)							
-- Euclid	60	21		m^2	1260	248	312480
-- Seward	60	21		m^2	1260	248	312480
-- Pallister	60	10		m^2	600	248	148800
-- West Grand	50	38		m^2	1900	248	471200
-- Milwaukee	55	14		m^2	770	248	190960
-- Warren	60	35		m^2	2100	248	520800
-- Forrest	60	16		m^2	960	248	238080
I-94 Mainline Bridges							
-- SB M-10 / I-94	400	18		m^2	7200	248	1785600
-- NB M-10 / I-94	400	18		m^2	7200	248	1785600
Pedestrian Bridges							
-- Holden	80	3		m^2	288	140	40320
-- Wayne State	140	3		m^2	504	140	70560
-- Canfield	85	3		m^2	306	140	42840
Railroad Bridges							
Grand Trunk Western - North	300	12		m^2	3660	140	512400
Grand Trunk Western - South	300	12		m^2	3660	140	512400
Vehicular Bridges (X-overs)							
-- Clay	70	30		m^2	2100	248	520800
-- West Grand	100	30		m^2	3000	248	744000
-- Milwaukee	75	18		m^2	1350	248	334800
-- Ferry	135	18		m^2	2430	248	602640
-- Warren	75	50		m^2	3750	248	930000
-- Canfield	75	18		m^2	1350	248	334800
-- SB Ramp to Warren	50	9		m^2	460	248	114080
-- NB Ramp from Warren	70	9		m^2	644	248	159712
-- WB I-94 to SB I-75	320	13		m^2	4256	248	1055488
-- EB I-94 to NB I-75	125	9		m^2	1150	248	285200
-- NB I-75 to WB I-94	275	9		m^2	2530	248	627440
-- SB I-75 to EB I-94	200	9		m^2	1840	248	456320
I-94 Mainline Bridges							
-- SB I-75 over I-94	100	18		m^2	1800	248	446400
-- NB I-75 over I-94	100	18		m^2	1800	248	446400
Pedestrian Bridges							
N/A				m^2	0	140	0
Railroad Bridges							
-- Grand Trunk Western Spur - North	80	12		m^2	960	248	238080
-- Grand Trunk Western Spur - South	80	18		m^2	1440	248	357120

Removal of Structure **$35,948,011**

= Noted as discrepancies and not included in VE
Revised Enhanced No-Build (Exhibit 2.4b)

Exhibit 2.4a
DEIS Enhanced No-Build Alternaive
Removal of Structures

Demolition	Length	Width	Area	Unit Cost	Total
Grand River	251	100	25,100	$25	$627,500
Linwood Street	173	62	10,726	$25	$268,150
14th Street	166	80	13,280	$25	$332,000
GT Western Conrail (W) over I-94	174	70	12,180	$45	$548,100
GT Western Conrail (E) over I-94	174	40	6,960	$45	$313,200
Rosa Parks	120	50	6,000	$25	$150,000
Trumbull	210	88	18,480	$25	$462,000
Brooklyn Ped over I-94	347	12	4,164	$15	$62,460
Third Ave.	421	70	29,470	$25	$736,750
Second Ave.	214	80	17,120	$25	$428,000
I-94 WB to M-10 SB -S26 (West to South) -S26	1158	45	52,110	$25	$1,302,750
M-10 SB over M-10 NB to I-94 WB -S22	232	60	13,920	$25	$348,000
M-10 NB (Mainline) -S27	297	50	14,850	$25	$371,250
M-10 SB (Mainline) -S24	297	50	14,850	$25	$371,250
M-10 NB over M-10 SB to I-94 EB -S29	224	55	12,320	$25	$308,000
I-94 EB to M-10 NB (East to North) -S25	1134	45	51,030	$25	$1,275,750
I-94 EB over I-94 EB to M-10 SB (East) -S23	186	55	10,230	$25	$255,750
I-94 WB over M-10 SB to I-94 EB -S28	196	55	10,780	$25	$269,500
Cass	190	80	15,200	$25	$380,000
Woodward	237	125	29,625	$25	$740,625
John R	172	60	10,320	$25	$258,000
Brush	171	50	8,550	$25	$213,750
Beaubien	174	60	10,440	$25	$261,000
I75/I94 -S27	188	130	24,440	$25	$611,000
I-75 SB to I-94 WB -S28	153	45	6,885	$25	$172,125
I-94 WB to I-75 SB -S24	309	40	12,360	$25	$309,000
I-75 SB over I-75 and I-94 -S30	827	34	28,118	$25	$702,950
94W to 75S (West to South) over I-75 -S29	186	35	6,510	$25	$162,750
94E to 75N (East to North) -S26	585	35	20,475	$25	$511,875
NB I-75 to WB I-94 -S25	772	35	27,020	$25	$675,500
I-94 EB Ent ramp -S21	172	30	5,160	$25	$129,000
I-94 EB to I-75 NB -S23	307	30	9,210	$25	$230,250
I-94 WB to I-75 S over I-94 E to I-75 N -S22	165	45	7,425	$25	$185,625
E. Grand Braided Ramp	183	30	5,490	$25	$137,250
Chene	170	65	11,050	$25	$276,250
E. Grand	186	120	22,320	$25	$558,000
Lucky Place	174	45	7,830	$25	$195,750
Saginaw U Turn	161	60	9,660	$25	$241,500
M. Elliott	169	70	11,830	$25	$295,750
Harper EB	171	40	6,840	$25	$171,000
Conrail RR	120	50	6,000	$45	$270,000
Concord	168	65	10,920	$25	$273,000
Helen Ped	171	12	2,052	$15	$30,780
Frontenac	168	60	10,080	$25	$252,000
Townsend Ped	194	10	1,940	$15	$29,100
Van Dyke	167	100	16,700	$25	$417,500
Seminole Ped	218	10	2,180	$15	$32,700
Burns	167	65	10,855	$25	$271,375
Rohns Ped	159	12	1,908	$15	$28,620
McClellan	224	55	12,320	$25	$308,000
Gratiot	284	120	34,080	$25	$852,000
Cadillac	185	70	12,950	$25	$323,750
French	171	60	10,260	$25	$256,500
Springfield Ped	197	10	1,970	$15	$29,550
Conrail RR	127	50	6,350	$45	$285,750
Conrail RR (Spur)	125	25	3,125	$45	$140,625
West Conner	220	60	13,200	$25	$330,000
East Conner	171	60	10,260	$25	$256,500
Malcolm Ped	217	12	2,604	$15	$39,060
Barrett	171	70	11,970	$25	$299,250

Totals **$20,575,420**

Assumptions

VE Study Removal Costs: Widths taken from aerial, lengths taken from MDOT Report 44 (Bridge Inventory Report)

Construction Costs: Widths taken from aerial, add 7' to each side for sidewalk in areas it applies.

Length of bridges taken from aerial and added 10' from edge of metal to face of full height abutment.

Bridge Costs(per square foot):

Removal	Pedestrian bridge	$15/SF
	Highway or local street bridge	$25/SF
	Railroad bridge	$45/SF

= Bridges included in VE Revised Enhanced No-Build cost which were not included in DEIS Enhanced No-Build Exhibit 2.41

Exhibit 2.4b
Enhanced No-Build Alternative -Revised by VE Study
Removal of Structures

VE of Enhanced No-Build Alternative

3.0 Cost Analysis

3.1 Cost Scenarios

The cost analysis presents various scenarios ranging from no build, enhanced no build to build. The following table was taken from the DEIS. This table shows cost estimates for these three categories.

Categories	No-Build Alternative	Enhanced No-Build Alternative	Build Alternative
Construction	$0	$673	$950
Right-of-Way	$0	$0	$56
Design and Construction Engineering	$0	$169	$238
Total	$16*	$842	$1,244

Table 4.2

I-94 Rehabilitation Project Cost Estimates (In Millions, 2000 Dollars)
(* Cost for Pavement Rehabilitation does not include bridge replacement costs)

Detailed cost estimates with totals different from Table 4.2 were provided and are the basis for this analysis. The estimates for the DEIS Enhanced No-build Alternative is included in Appendix A and the DEIS Build Alternative is included in Appendix C.

These three cost categories have now been further broken into seven scenarios. Each step or scenario has a range of possibilities. The seven scenarios are described below. Exhibit 3.2 presents these scenarios graphically to show the progression of costs and scope of work moving from the no-build to the build alternative. The No-Build estimate closely follows Scenarios 1-5 and the Enhanced No-Build - Revised is similar to Scenario 6.

Scenario 1

The scope of this scenario includes milling and resurfacing the I-94, M-10 and I-75 mainlines and shoulders. The ramps within the project limits are not included. Work on the structures within the projects limits is limited to minor repairs. The cost estimated for these repairs to both the decks and substructure is assumed to be 50% of the sum of the cost calculated for 20% patching of the deck area. Cleaning and minor repairs to the drainage system will also be included.

Scenario 2

The scope of this scenario includes the milling of the existing overlay, patching the concrete (20% of the total pavement area) and providing a new asphalt overlay on both the mainline and ramps. All bridges within the project limits will be patched (20% of the deck area). Bridge work will include substructure repairs. Minor repairs to the existing retaining walls are included. Cleaning and replacement of the drainage structures will also be included.

Scenario 3

The scope of this scenario includes the reconstruction of the I-94, M-10 and I-75 mainline pavement, some additional auxiliary lanes, acceleration and deceleration lanes, shoulders, curb and gutter and the ramp pavement at the M-10 and I-75 and the local interchanges including excavation and aggregate base. It does not include the replacement of the median barrier wall. Bridge work will include replacing the superstructures on all bridges and substructure repairs. Retaining walls will be included as required to accommodate the additional auxiliary and acceleration and deceleration lanes that can be constructed without impact to bridges. Cleaning and replacement of the drainage structures and partial replacement of pipe will also be included.

Scenario 4

The scope of this scenario includes the reconstruction of the I-94, M-10 and I-75 mainline pavement, some additional auxiliary lanes, acceleration and deceleration lanes, shoulders, curb and gutter and the ramp pavement at the M-10 and I-75 and the local interchanges including excavation and aggregate base. It does not include the replacement of the median barrier wall. All bridges will be reconstructed to meet existing lane and shoulder configuration. Retaining walls will be included as required to accommodate the additional auxiliary and acceleration and deceleration lanes that can be constructed without impact to bridges. Cleaning and replacement of the drainage structures and partial replacement of pipe will also be included

Scenario 5

The scope of this scenario includes the reconstruction of the I-94, M-10 and I-75 mainline pavement and the ramp pavement at the M-10 and I-75 and the local interchanges. The work would provide curb and gutter, median barrier, lighting and additional auxiliary lanes that can be constructed within existing ROW. All bridges will be reconstructed and lengthened for additional auxiliary lanes. The total reconstruction of the existing drainage system and pump stations is also included. The cost of the reconstructed drainage system and pump stations is assumed to be 60 percent of the cost for the Build Alternative.

Scenario 6

The Enhanced No-Build Alternative, as updated by others in June 2004 and included in Appendix B, proposed reconstruction of the existing freeway to provide new pavement, bridges, shoulders and ramps to partially meet standards. It would also add auxiliary, acceleration, and deceleration lanes where possible, within existing rights-of-way. The two major freeway/freeway interchanges would also be reconstructed in their current configuration. It does not provide for any increases in capacity. This alternative does not address the local traffic circulation, community access, environmental, economic, and neighborhood issues.

Scenario 7

The scope of this scenario is the full recommended build alternative. All bridges will be reconstructed to accommodate the recommended build alternative. Retaining walls will be expanded to accommodate the fourth mainline lane in each direction. The entire existing service drive will be milled and overlaid, the gaps filled in and made continuous through both the M-10 and I-75 interchanges. The sidewalks and curb and gutter will be removed and replaced along the entire service drive. The drainage system for the freeway and service drive will be completely reconstructed meeting the needs of the recommended build alternative. The basis for the cost of Scenario 7 is the value engineering cost (2001 dollars) developed for the build alternative in a separate report. Details of the VE Build Alternative cost estimate are included in Appendix D. The cost previously developed has been revised to include additional reserves for national security issues. These issues assist the stability of the bridges in the event of an explosion occurring beneath the bridges. Details of the revised VE Build Alternative cost estimate are included in Appendix E.

3.0 Cost Analysis

	NO BUILD					ENHANCED NO BUILD	BUILD
	Scenario #1	Scenario #2	Scenario #3	Scenario #4	Scenario #5	Scenario #6	Scenario #7
Items (per DEIS)							
Asphalt Pavement	---	$300,000	$600,000	$1,200,000	$1,200,000	$1,200,000	$3,900,000
Concrete Pavement	---	---	$46,700,000	$46,700,000	$60,400,000	$60,400,000	$99,200,000
Mill and Overlay	$6,400,000	$14,500,000	---	---	---	---	$600,000
Removal of Surfacing	---	---	---	$2,100,000	$2,100,000	$2,100,000	$2,100,000
Curb and Gutter	---	---	$2,700,000	$2,700,000	$2,700,000	$2,700,000	$1,600,000
Sidewalk	---	---	---	$1,300,000	$1,300,000	$1,300,000	$1,300,000
Concrete Median Pavement	---	---	---	---	---	---	$400,000
Bridges	$4,700,000	$9,200,000	$63,500,000	$90,700,000	$120,100,000	$176,200,000	$223,100,000
Retaining Walls	---	$300,000	$32,300,000	$32,400,000	$48,500,000	$48,500,000	$64,700,000
Removal of Structures	---	---	$12,800,000	$20,500,000	$24,800,000	$24,800,000	$24,800,000
Signals	---	---	---	---	---	---	$5,200,000
Lighting	---	---	---	$10,000,000	$10,000,000	$10,000,000	$10,000,000
Signing	---	---	$11,000,000	$11,000,000	$11,000,000	$11,000,000	$13,000,000
Striping	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
RR Crossing	---	---	---	---	---	---	$400,000
Drainage	$1,000,000	$2,000,000	$4,000,000	$4,000,000	$16,400,000	$16,400,000	$59,400,000
Pump Stations	---	---	---	---	$4,000,000	$4,000,000	$8,000,000
Concrete Barrier Wall	---	---	---	---	$3,400,000	$3,400,000	$13,500,000
Landscaping	---	---	$2,000,000	$2,000,000	$2,000,000	$5,000,000	$8,000,000
Subtotal Cost	**$12,300,000**	**$26,500,000**	**$175,800,000**	**$224,800,000**	**$308,100,000**	**$367,200,000**	**$539,400,000**
Utilities	$200,000	$500,000	$3,500,000	$4,500,000	$6,200,000	$9,500,000	$10,700,000
Traffic Control	$1,600,000	$3,400,000	$22,900,000	$29,200,000	$40,100,000	$50,500,000	$69,200,000
Contingency	$3,100,000	$6,600,000	$44,000,000	$56,200,000	$77,000,000	$115,100,000	$132,200,000
Mobilization	$500,000	$1,100,000	$7,000,000	$9,000,000	$12,300,000	$20,800,000	$23,400,000
Mobilization, Special	---	---	$18,300,000	$18,300,000	$18,300,000	$18,300,000	---
Enhancement	$1,200,000	$2,700,000	$4,400,000	$5,600,000	$9,200,000	$13,500,000	$20,100,000
ITS	---	---	$22,300,000	$22,300,000	$22,300,000	$22,300,000	$22,300,000
Subtotal Cost	**$18,900,000**	**$40,800,000**	**$298,200,000**	**$369,900,000**	**$493,500,000**	**$617,200,000**	**$817,300,000**
Engineering	$4,700,000	$10,200,000	$74,600,000	$92,500,000	$123,400,000	$125,100,000	$159,900,000
Right-of-Way	---	---	---	---	---	$1,000,000	$35,000,000
Grand Total ($2001)	$23,600,000	$51,000,000	$372,800,000	$462,400,000	$616,900,000	$743,300,000	$1,012,200,000
Grand Total ($2004)	$27,300,000	$59,000,000	$431,600,000	$535,300,000	$714,100,000	$860,500,000	$1,171,800,000

Table 3.1

Notes:

Mobilization, Special: In the Enhanced No Build estimate it was assumed that the project would be completed under several contracts and over a long period of time. Mobilization, Special was added during the VE Study to account for multiple contracts over an extended period.

Rounding of numbers: The dollars on this spread sheet have been rounded to the nearest $100,000. Based on this rounding the numbers may not match exactly to the dollars shown in the VE report Vol. 2.

Costs in the this table include dollars allocated to allowances and reserves. The costs associated with the contingencies are shown separately. Scenario 6 costs have been generated from information included in Appendix B.

ROW: An additional $15 million for ROW is included in the contingency above for a total of $50 million for Scenario #7.

2004 Dollars: The 2004 estimates are based on an annual inflation rate of 5%.

3.0
Cost Analysis

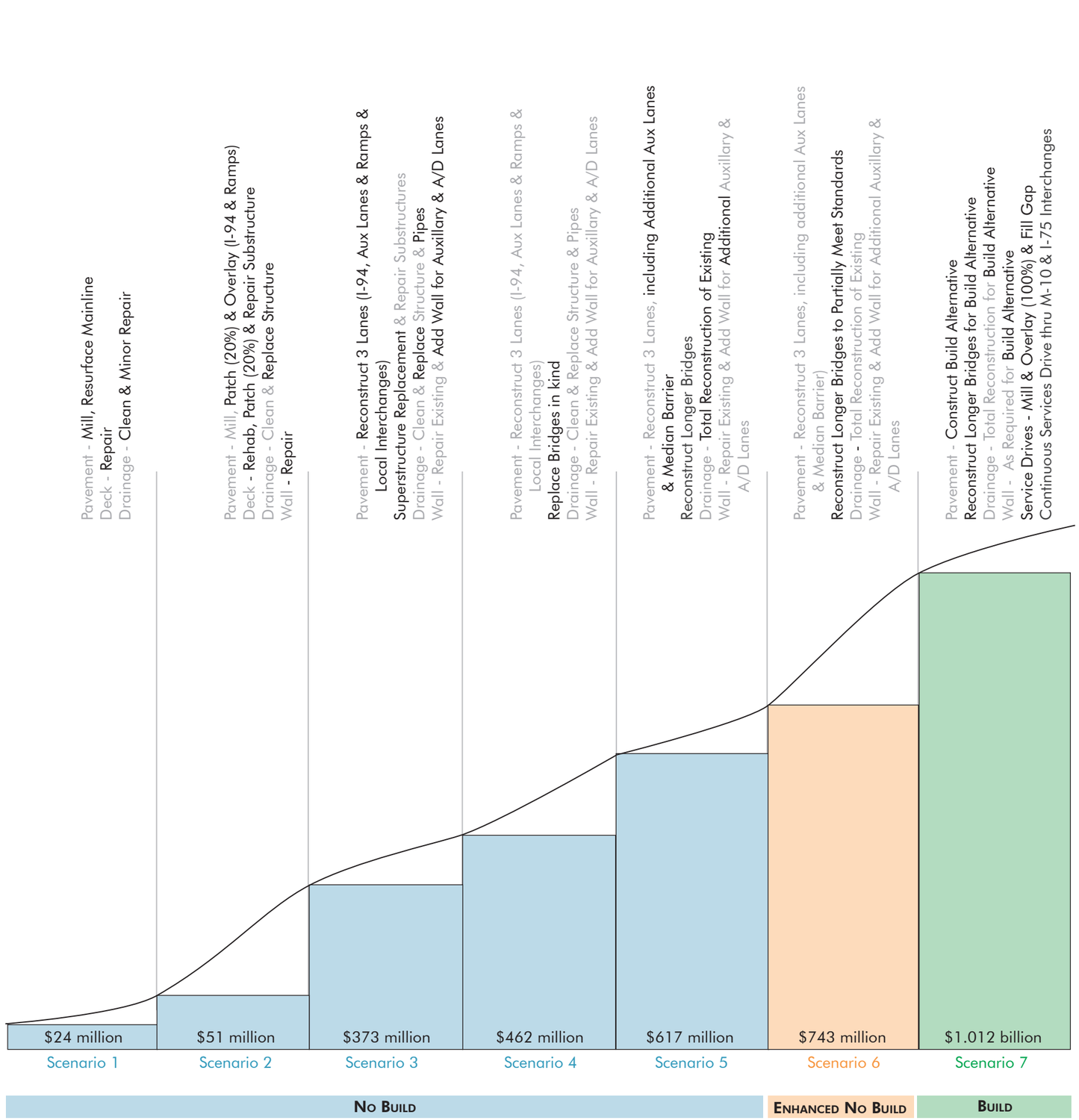

Exhibit 3.2
(2001 dollars)

VE of Enhanced No-Build Alternative

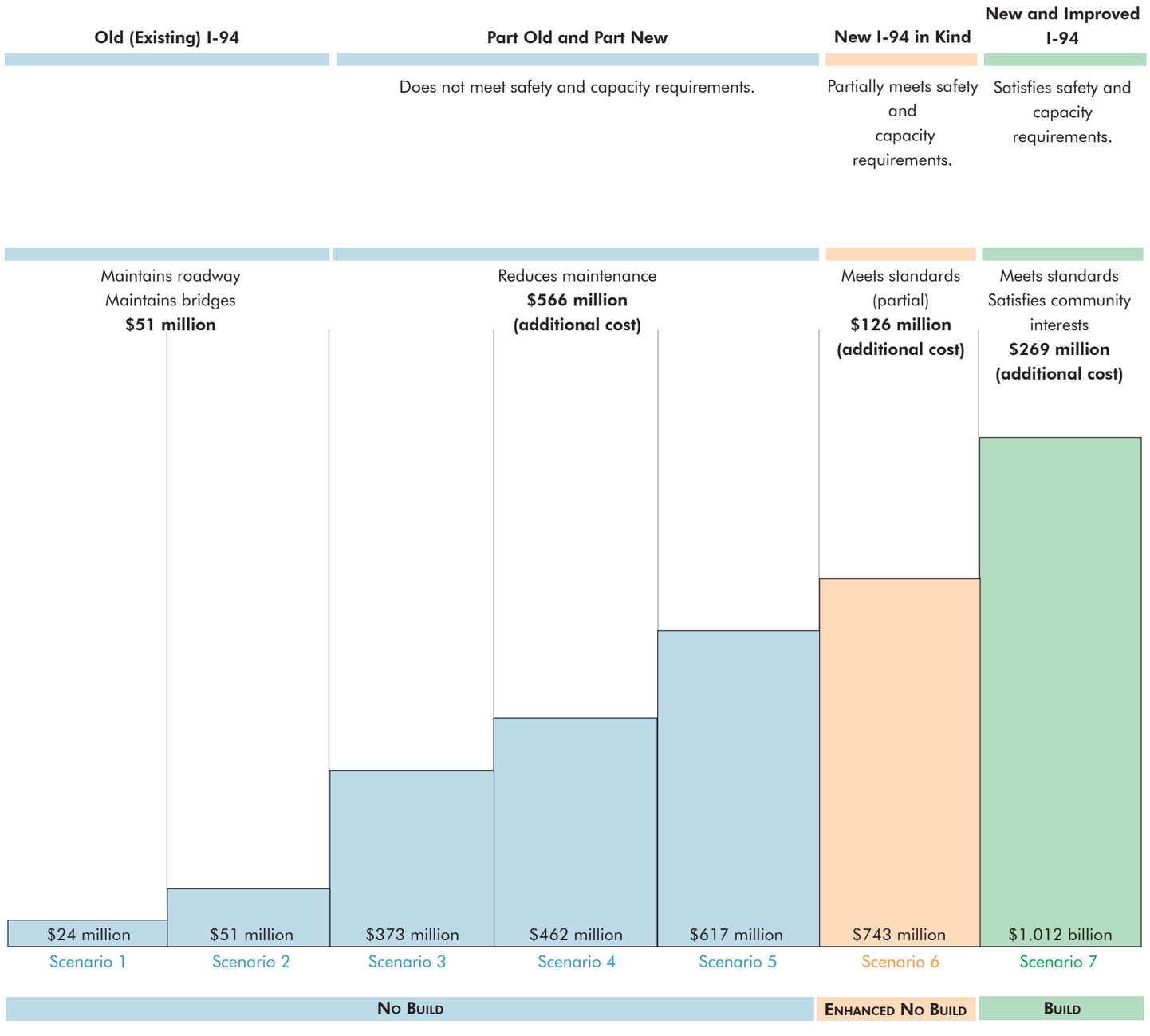

Exhibit 3.3
(2001 dollars)

3.0 Cost Analysis

Superstructure Demolition	Length	Width	Area	Unit Cost	Total
Grand River Street	251	100	25,100	$15	$376,500
Linwood Street	173	62	10,726	$15	$160,890
14th Street	166	80	13,280	$15	$199,200
GT Western Conrail (W) over I-94	174	70	12,180	$45	$548,100
GT Western Conrail (E) over I-94	174	40	6,960	$45	$313,200
Rosa Parks	120	50	6,000	$15	$90,000
Trumbull	210	88	18,480	$15	$277,200
Brooklyn Ped over I-94	347	12	4,164	$9	$37,476
Third Ave.	421	70	29,470	$15	$442,050
Second Ave.	214	80	17,120	$15	$256,800
I-94 WB to M-10 SB -S26 (West to South) -S26	1158	45	52,110	$15	$781,650
M-10 SB over M-10 NB to I-94 WB -S22	232	60	13,920	$15	$208,800
M-10 NB (Mainline) -S27	297	50	14,850	$15	$222,750
M-10 SB (Mainline) -S24	297	50	14,850	$15	$222,750
M-10 NB over M-10 SB to I-94 EB -S29	224	55	12,320	$15	$184,800
I-94 EB to M-10 NB (East to North) -S25	1134	45	51,030	$15	$765,450
I-94 EB over I-94 EB to M-10 SB (East) -S23	186	55	10,230	$15	$153,450
I-94 WB over M-10 SB to I-94 EB -S28	196	55	10,780	$15	$161,700
Cass	190	80	15,200	$15	$228,000
Woodward	237	125	29,625	$15	$444,375
John R	172	60	10,320	$15	$154,800
Brush	171	50	8,550	$15	$128,250
Beaubien	174	60	10,440	$15	$156,600
I75/I94 -S27	188	130	24,440	$15	$366,600
I-75 SB to I-94 WB -S28	153	45	6,885	$15	$103,275
I-94 WB to I-75 SB -S24	309	40	12,360	$15	$185,400
I-75 SB over I-75 and I-94 -S30	827	34	28,118	$15	$421,770
94W to 75S (West to South) over I-75 -S29	186	35	6,510	$15	$97,650
94E to 75N (East to North) -S26	585	35	20,475	$15	$307,125
NB I-75 to WB I-94 -S25	772	35	27,020	$15	$405,300
I-94 EB Ent ramp -S21	172	30	5,160	$15	$77,400
I-94 EB to I-75 NB -S23	307	30	9,210	$15	$138,150
I-94 WB to I-75 S over I-94 E to I-75 N -S22	165	45	7,425	$15	$111,375
E. Grand Braided Ramp	183	30	5,490	$15	$82,350
Chene	170	65	11,050	$15	$165,750
E. Grand	186	120	22,320	$15	$334,800
Lucky Place	174	45	7,830	$15	$117,450
Saginaw U Turn	161	60	9,660	$15	$144,900
M. Elliott	169	70	11,830	$15	$177,450
Harper EB	171	40	6,840	$15	$102,600
Conrail RR	120	50	6,000	$27	$162,000
Concord	168	65	10,920	$15	$163,800
Helen Ped	171	12	2,052	$15	$30,780
Frontenac	168	60	10,080	$15	$151,200

Superstructure Demolition	Length	Width	Area	Unit Cost	Total
Townsend Ped	194	10	1,940	$15	$29,100
Van Dyke	167	100	16,700	$15	$250,500
Seminole Ped	218	10	2,180	$15	$32,700
Burns	167	65	10,855	$15	$162,825
Rohns Ped	159	12	1,908	$15	$28,620
McClellan	224	55	12,320	$15	$184,800
Gratiot	284	120	34,080	$15	$511,200
Cadillac	185	70	12,950	$15	$194,250
French	171	60	10,260	$15	$153,900
Springfield Ped	197	10	1,970	$15	$29,550
Conrail RR	127	50	6,350	$27	$171,450
Conrail RR (Spur)	125	25	3,125	$27	$84,375
West Conner	220	60	13,200	$15	$198,000
East Conner	171	60	10,260	$15	$153,900
Malcolm Ped	217	12	2,604	$15	$39,060
Barrett	171	70	11,970	$15	$179,550

Totals **$12,765,696**

Assumptions
Removal Costs: Widths taken from aerial, lengths taken from Report 44 (Bridge Inventory Report)
Construction Costs: Widths taken from aerial, add 7' to each side for sidewalk in areas it applies.
Length of bridges taken from aerial and added 10' from edge of metal to face of full height abutment.

Bridge Costs(per square foot):

Removal	Pedestrian bridge	$9/SF
	Highway or local street bridge	$15/SF
	Railroad bridge	$27/SF

Enhanced No-Build Bridge Cost Validation by VE Study
Bridge Superstructure
Removal of Structures
Exhibit 3.4

	Enhanced No-Build Bridge Cost Validation	Superstructure Replacement				
		Length	Width	Area	Unit Cost	Total
A	Grand River Street	251	100	25,100	$56	$1,405,600
	Linwood Street	173	62	10,726	$56	$600,656
	14th Street	166	80	13,280	$56	$743,680
	GT Western Conrail (W) over I-94	174	70	12,180	$326	$3,964,590
	GT Western Conrail (E) over I-94	174	40	6,960	$326	$2,265,480
	Rosa Parks	120	50	6,000	$56	$336,000
	Trumbull	210	88	18,480	$56	$1,034,880
	Brooklyn Ped over I-94	347	12	4,164	$56	$233,184
	Third Ave.	421	70	29,470	$56	$1,650,320
	Second Ave.	214	80	17,120	$56	$958,720
D	I-94 WB to M-10 SB -S26 (West to South) -S26	1158	45	52,110	$84	$4,377,240
	M-10 SB over M-10 NB to I-94 WB -S22	232	60	13,920	$84	$1,169,280
	M-10 NB (Mainline) -S27	297	50	14,850	$70	$1,039,500
	M-10 SB (Mainline) -S24	297	50	14,850	$70	$1,039,500
	M-10 NB over M-10 SB to I-94 EB -S29	224	55	12,320	$84	$1,034,880
	I-94 EB to M-10 NB (East to North) -S25	1134	45	51,030	$84	$4,286,520
	I-94 EB over I-94 EB to M-10 SB (East) -S23	186	55	10,230	$84	$859,320
	I-94 WB over M-10 SB to I-94 EB -S28	196	55	10,780	$84	$905,520
B	Cass	190	80	15,200	$56	$851,200
	Woodward	237	125	29,625	$56	$1,659,000
	John R	172	60	10,320	$56	$577,920
	Brush	171	50	8,550	$56	$478,800
	Beaubien	174	60	10,440	$56	$584,640
E	I75/I94 -S27	188	130	24,440	$70	$1,710,800
	I-75 SB to I-94 WB -S28	153	45	6,885	$140	$963,900
	I-94 WB to I-75 SB -S24	309	40	12,360	$84	$1,038,240
	I-75 SB over I-75 and I-94 -S30	827	34	28,118	$84	$2,361,912
	94W to 75S (West to South) over I-75 -S29	186	35	6,510	$84	$546,840
	94E to 75N (East to North) -S26	585	35	20,475	$84	$1,719,900
	NB I-75 to WB I-94 -S25	772	35	27,020	$84	$2,269,680
	I-94 EB Ent ramp -S21	172	30	5,160	$140	$722,400
	I-94 EB to I-75 NB -S23	307	30	9,210	$84	$773,640
	I-94 WB to I-75 S over I-94 E to I-75 N -S22	165	45	7,425	$84	$623,700
C	E. Grand Braided Ramp	183	30	5,490	$56	$307,440
	Chene	170	65	11,050	$56	$618,800
	E. Grand	186	120	22,320	$56	$1,249,920
	Lucky Place	174	45	7,830	$56	$438,480
	Saginaw U Turn	161	60	9,660	$56	$540,960
	M. Elliott	169	70	11,830	$56	$662,480
	Harper EB	171	40	6,840	$56	$383,040
	Conrail RR	120	50	6,000	$326	$1,953,000
	Concord	168	65	10,920	$56	$611,520
	Helen Ped	171	12	2,052	$56	$114,912
	Frontenac	168	60	10,080	$56	$564,480
	Townsend Ped	194	10	1,940	$56	$108,640
	Van Dyke	167	100	16,700	$56	$935,200
	Seminole Ped	218	10	2,180	$56	$122,080
	Burns	167	65	10,855	$56	$607,880
	Rohns Ped	159	12	1,908	$56	$106,848
	McClellan	224	55	12,320	$56	$689,920
	Gratiot	284	120	34,080	$56	$1,908,480
	Cadillac	185	70	12,950	$56	$725,200
	French	171	60	10,260	$56	$574,560
	Springfield Ped	197	10	1,970	$56	$110,320
	Conrail RR	127	50	6,350	$326	$2,066,925
	Conrail RR (Spur)	125	25	3,125	$326	$1,017,188
	Conner	150	173	25,950	$56	$1,453,200
	West Conner	220	60	13,200		$0
	East Conner	171	60	10,260		$0
	Malcolm Ped	217	12	2,604	$56	$145,824
	Barrett	171	70	11,970	$56	$670,320
	Totals					$63,475,059
	Widen/Rebuild Dequindre (I-94)	0	0	0	$0	$0

Cross road bridges	$56
Mainline over Mainline	$70
Interstate bridges	$84
Braided Ramps	$140
Dequindre	$105
Railroad	$326

RR cost is limited to replacement cost

There is not expected to be any work to the Dequindre bridge as it has already been improved to the current freeway standards in the late 1990's.

Enhanced No-Build Bridge Cost Validation by VE Study
Bridge Superstructure Replacement
Bridges
Exhibit 3.5

VE of Enhanced No-Build Alternative

Appendix A
DEIS
Cost Estimate for Enhanced No-Build Alternative

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Estimate Major Items							
Removals							
-- Mainline Pavement (EB)	2664	11		m^2	29304	6	175824
-- Mainline Pavement (WB)	2664	11		m^2	29304	6	175824
-- Auxiliary Lane Pavement (EB)	2664	3	50%	m^2	4795	6	28771
-- Auxiliary Lane Pavement (WB)	2664	3	50%	m^2	4795	6	28771
-- Shoulders - mainline (L+R) EB	2664	4		m^2	12521	6	75125
-- Shoulders - mainline (L+R) WB	2664	4		m^2	12521	6	75125
-- Curb & Gutter (EB)	2664		200%	m	5328	39	207792
-- Curb & Gutter (WB)	2664		200%	m	5328	39	207792
-- Sidewalks (EB)	2664	1		m^2	4795	4	19181
-- Sidewalks (WB)	2664	1		m^2	4795	4	19181
Entrance/Exit Ramps							
-- EB 1 Ramp	971	3		m^2	3496	6	20974
-- WB 1 Ramp	1032	3		m^2	3715	6	22291
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps	268	7		m^2	1956	6	11738
-- Eastbound Service Drive	1341	6		m^2	8985	6	53908
-- Westbound Service Drive	299	6		m^2	2003	6	12020
Vehicular Bridges (X-overs)							
-- Grand River	110	30		m^2	3300	248	818400
-- Linwood Ave.	53	19		m^2	1007	248	249736
-- 14th Street	53	25		m^2	1325	248	328600
-- Rosa Parks Blvd.	79	15		m^2	1185	248	293880
-- Trumbull	67	15		m^2	1005	248	249240
-- Third Street	134	12		m^2	1608	248	398784
-- Second Ave.	65	25		m^2	1625	248	403000
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
-- WSU Athletic Field	128	3		m^2	460	140	64512
Railroad Bridges							
-- GTW/Conrail	110	24		m^2	2684	495	1328580
-- RR Spur (Rosa Parks)	55	18		m^2	990	495	490050
Subtotal Removals							5759099
New Construction							
Pavements							
Mainline Pavement							
-- EB 3 Lanes	2664	10		m^2	28771	35	1006992
-- WB 3 Lanes	2664	10		m^2	28771	35	1006992
-- Auxiliary Lane Pavement (EB)	2664	3	50%	m^2	4795	32	153446
-- Auxiliary Lane Pavement (WB)	2664	3	50%	m^2	4795	32	153446
-- Shoulders - mainline (L+R) EB	2664	4		m^2	12521	35	438228
-- Shoulders - mainline (L+R) WB	2664	4		m^2	12521	35	438228
-- Curb & Gutter (EB)	2664		200%	m	5328	32	174758
-- Curb & Gutter (WB)	2664		200%	m	5328	32	174758
-- Sidewalks (EB)	2664	1		m^2	4795	32	154885
-- Sidewalks (WB)	2664	1		m^2	4795	32	154885
Entrance/Exit Ramps							
-- EB 1 Ramp	971	3		m^2	3496	35	122346
-- WB 1 Ramp	1032	3		m^2	3715	35	130032
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps	268	7		m^2	1930	35	67536
-- Eastbound Service Drive	1341	6		m^2	8985	35	314465
-- Westbound Service Drive	299	6		m^2	2003	35	70116
-- Aggregate Base Under Conc. (9")				m^2	121893	6	731359
Vehicular Bridges (X-overs)							
-- Grand River							
Superstructure	110	3		m^2	330	860	283800
Substructure				LSUM		32	10560
-- Linwood Ave.							
Superstructure	53	19		m^2	1007	860	866020
Substructure				LSUM		32	26010
-- 14th Street							
Superstructure	53	25		m^2	1325	860	1139500
Substructure				LSUM		32	24825
-- Rosa Parks Blvd							
Superstructure	79	15		m^2	1185	860	1019100
Substructure				LSUM		32	39000
-- Trumbull							
Superstructure	67	15		m^2	1005	860	864300
Substructure				LSUM		32	33000
-- Third Street							
Superstructure	134	12		m^2	1608	860	1382880
Substructure				LSUM		32	88440
-- Second Ave.							
Superstructure	65	25		m^2	1625	860	1397500
Substructure				LSUM		32	42915
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
-- WSU Athletic Field	128	3		m^2	460	323	148838
Railroad Bridges							
-- GTW/Conrail							
Superstructure	110	10		m^2	1177	1722	2026794
Substructure						64	76034
Retaining Walls							
-- Retaining wall surface (0.6m x 1.2m)	5328	6	50%	m^2	16250	485	7881444
-- Barriers							
Median - double face (0.4cm/m)	2664			m^3	1045	390	407634
(EB) - single face (0.36 m^3/m)	1341		50%	m^3	242	390	94223
(WB) - single face (0.36 m^3/m)	299		50%	m^3	54	390	21009
Subtotal Pavements							23166299

Figure A-1
Segment A
I-96 to Cass Street

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Earthwork							
-- Excavation	2664			m^3	56839	6	315457
-- Embankment				m^3			0
-- Subbase				m^3			0
Subtotal Earthwork							315457
Pump Station (8000 in gpm)				EACH	1		100000
Pump Station (9000 in gpm)				EACH	1		150000
Pump Station (12000 in gpm)				EACH	1		200000
Total Major Items							29690855
Add in Other Construction Items							
-- Signing				LSUM	5	3750	19875
-- Stripping				LSUM	14567	1	19228
-- Traffic Signals				LSUM	8	15K	120000
-- Intelligent Transportation Systems (ITS)	5328			m	5328	625	3330000
-- Utilities (est. from Davison bids)				m			3976418
Highway Lighting							
-- Mainline				LSUM			120400
-- Service Drives				LSUM			197135
-- Restoration/Landscaping				LSUM			11000
Total Other Construction							7794057
Total Items + Other Construction							**37484912**
Add Percentage for Contingency			20%				7496982
Total Items + Other Construction + Contingency							**44981894**
Add Percentage for Traffic Control			15%				6747284
Mobilization			10%				4498189
Total Items + Other Construction + Contingency + Traffic Control							**56227367**
Add Percentage for Mobilization (5-10%)			10%				5622737
Grand Total Segment A							**$61,850,104**

Figure A-1
Segment A
I-96 to Cass Street (cont.)

Appendix A
DEIS
Cost Estimate for Enhanced No-Build Alternative

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Estimate Major Items							
Removals							
-- Mainline Pavement (EB)	2396	11		m^2	26356	6	158136
-- Mainline Pavement (WB)	2396	11		m^2	26356	6	158136
-- Auxiliary Lane Pavement (EB)	2396	3	50%	m^2	4312	6	25877
-- Auxiliary Lane Pavement (WB)	2396	3	50%	m^2	4312	6	25877
-- Shoulders -mainline (L+R) EB	2396	4		m^2	11261	6	67567
-- Shoulders -mainline (L+R) WB	2396	4		m^2	11261	6	67567
-- Curb & Gutter (EB)	2396		200%	m	4792	5	23960
-- Curb & Gutter (WB)	2396		200%	m	4792	5	23960
-- Sidewalks (EB)	2396	3		m^2	7188	4	28752
-- Sidewalks (WB)	2396	3		m^2	7188	4	28752
Entrance/Exit Ramps							
-- EB 1 Ramp	1536	3		m^2	5529	6	33178
-- WB 1 Ramp	1250	3		m^2	4500	6	27000
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps (N/A)		7					
-- Eastbound Service Drive	768	6		m^2	5145	6	30874
-- Westbound Service Drive	853	6		m^2	5715	6	34291
Vehicular Bridges (X-overs)							
-- Cass Ave.	58	24		m^2	1415	248	350970
-- Woodward Ave.	73	24		m^2	1786	248	442948
-- John R.	52	19		m^2	995	248	246909
-- Brush	52	19		m^2	991	248	245966
-- Beaubien	53	19		m^2	1007	248	249736
-- Chene	51	20		m^2	1072	248	265920
I-94 Dequindre Bridge	823	36		m^2	30121	248	7470206
Pedestrian Bridges							
N/A							
Railroad Bridges							
N/A							
Subtotal Removals							10006581
New Construction							
Pavements							
-- Mainline Pavement (EB)	2396	10		m^2	25876	35	905688
-- Mainline Pavement (WB)	2396	10		m^2	25876	35	905688
-- Auxiliary Lane Pavement (EB)	2396	3	50%	m^2	4312	32	138010
-- Auxiliary Lane Pavement (WB)	2396	3	50%	m^2	4312	32	138010
-- Shoulders -mainline (L+R) EB	2396	4		m^2	11261	35	394142
-- Shoulders -mainline (L+R) WB	2396	4		m^2	11261	35	394142
-- Curb & Gutter (EB)	2396		200%	m	4792	32	157178
-- Curb & Gutter (WB)	2396		200%	m	4792	32	157178
-- Sidewalks (EB)	2396	3		m^2	7188	32	232172
-- Sidewalks (WB)	2396	3		m^2	7188	32	232172

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Entrance/Exit Ramps							
-- EB 1 Ramp	1536	3		m^2	5530	35	193561
-- WB 1 Ramp	1250	3		m^2	4500	35	157500
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps (N/A)							
-- Eastbound Service Drive	768	6		m^2	5146	35	180119
-- Westbound Service Drive	853	6		m^2	5717	35	200122
-- Aggregate Base Under Conc. (9")				m^2	103796	6	622776
Vehicular Bridges (X-overs)							
-- Cass Ave.							
Superstructure	58	24		m^2	1415	861	1218487
Substructure				LSUM		4	5661
-- Woodward Ave.							
Superstructure	73	24		m^2	1786	861	1537815
Substructure				LSUM		4	7144
-- John R.							
Superstructure	52	18		m^2	990	861	852700
Substructure				LSUM		4	3961
-- Brush							
Superstructure	52	18		m^2	986	861	849445
Substructure				LSUM		4	3946
-- Beaubien							
Superstructure	53	18		m^2	1001	861	862464
Substructure				LSUM		4	4007
I-94 Dequindre Bridge							
Superstructure	823	36		m^2	30121	861	25934870
Substructure				LSUM		4	120487
Pedestrian Bridges							
N/A							
Railroad Bridges							
N/A							
Retaining Walls							
-- Retaining wall surface (0.6m x 1.2m)	4792	6	100%	m^2	29231	485	14177132
-- Barriers							
Median - double face (0.4cm/m)	2396			m^3	940	390	366626
(EB) - single face (0.36 m^3/m)	1536		50%	m^3	277	390	107925
(WB) - single face (0.36 m^3/m)	1250		50%	m^3	225	390	87829
Subtotal Pavements							51148957
Earthwork							
-- Excavation	2396			m^3	51121	5	283722
-- Embankment				m^3			0
-- Subbase				m^3			0
Subtotal Earthwork							283722

Figure A-1
Segment B
Cass Street to Grand Trunk Railroad

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Pump Stations (N/A)				EACH			0
Total Major Items							61439260
Add in Other Construction Items							
-- Signing				LSUM	5	3750	18113
-- Stripping				LSUM	13909	1	18360
-- Traffic Signals				LSUM	6	15K	90000
-- Intelligent Transportation Systems (ITS)	4792			m	4792	625	2995000
-- Utilities				m			3976418
Highway Lighting							
-- Mainline				LSUM			119635
-- Service Drives				LSUM			196370
-- Restoration/Landscaping				LSUM			10000
Total Other Construction							7423895
Total Items + Other Construction							**68863156**
Add Percentage for Contingency			20%				13772631
Total Items + Other Construction + Contingency							**82635787**
Add Percentage for Traffic Control			15%				12395368
Mobilization			10%				8263579
Total Items + Other Construction +							**95031155**
Contingency +Traffic Control							
Add Percentage for Mobilization (5-10%)			10%				9503115
Grand Total Segment B							**$104,534,270**

Figure A-1
Segment B
Cass Street Grand Trunk Railroad (cont.)

Appendix A
DEIS
Cost Estimate for Enhanced No-Build Alternative

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Estimate Major Items							
Removals							
-- Mainline Pavement (EB)	6206	11		m^2	68266	6	409596
-- Mainline Pavement (WB)	6206	11		m^2	68266	6	409596
-- Auxiliary Lane Pavement (EB)	6206	3	50%	m^2	11171	6	67025
-- Auxiliary Lane Pavement (WB)	6206	3	50%	m^2	11171	6	67025
-- Shoulders -mainline (L+R) EB	6206	4		m^2	29168	6	175009
-- Shoulders -mainline (L+R) WB	6206	4		m^2	29168	6	175009
-- Curb & Gutter (EB)	6206		200%	m	12412	39	484068
-- Curb & Gutter (WB)	6206		200%	m	12412	39	484068
-- Sidewalks (EB)	6206	1		m^2	11171	4	44683
-- Sidewalks (WB)	6206	1		m^2	11171	4	44683
Entrance/Exit Ramps							
-- EB 1 Ramp	3261	3		m^2	11740	6	70438
-- WB 1 Ramp	3237	3		m^2	11653	6	69919
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps (N/A)							
-- Eastbound Service Drive	3816	6		m^2	25567	6	153403
-- Westbound Service Drive	4048	6		m^2	27122	6	162730
Vehicular Bridges (X-overs)							
-- Chene	51	20		m^2	1072	248	265920
-- E. Grand Blvd.	49	40		m^2	1998	248	495489
-- Lucky St.	54	12		m^2	670	248	166105
-- Saginaw	48	24		m^2	1191	248	295299
-- Mt. Elliot	51	20		m^2	1066	248	264380
-- Harper	51	12		m^2	632	248	156726
-- Concord	51	20		m^2	1060	248	262840
-- Frontenac	51	18		m^2	968	248	239985
-- Van Dyke	50	29		m^2	1491	248	369860
-- Burns	50	18		m^2	958	248	237641
-- McClellan	68	17		m^2	1209	248	299810
-- Gratiot	115	30		m^2	3532	248	875911
-- Cadillac	56	20		m^2	1167	248	289535
-- French Rd.	52	18		m^2	985	248	244203
-- Conner	42	18		m^2	781	248	193790
* West Bridge	51	15		m^2	787	248	195265
* East Bridge	67	15		m^2	1018	248	252563
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
-- Helen	52	3		m^2	190	140	26623
-- Townsend	57	3		m^2	211	140	29587
-- Seminole	67	3		m^2	245	140	34288
-- Rohns	54	3		m^2	200	140	28054
-- Garland	58	4		m^2	251	140	35151
-- Springfield	58	3		m^2	212	140	29740
-- Malcolm	67	3		m^2	245	140	34288
Railroad Bridges							
-- Conrail RR (Mt. Elliot)	103	48		m^2	5056	248	1253809
-- Conrail RR (Conner)	115	30		m^2	3532	248	875911
Subtotal Removals							10270026

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
New Construction							
Pavements							
-- Mainline Pavement (EB)	6206	11		m^2	68266	35	2389310
-- Mainline Pavement (WB)	6206	11		m^2	68266	35	2389310
-- Auxiliary Lane Pavement (EB)	6206	3	50%	m^2	22342	32	714931
-- Auxiliary Lane Pavement (WB)	6206	3	50%	m^2	22342	32	714931
-- Shoulders -mainline (L+R) EB	6206	4		m^2	29168	35	1020887
-- Shoulders -mainline (L+R) WB	6206	4		m^2	29168	35	1020887
-- Curb & Gutter (EB)	6206		200%	m	12412	32	407114
-- Curb & Gutter (WB)	6206		200%	m	12412	32	407114
-- Sidewalks (EB)	6206	1		m^2	11171	32	360817
-- Sidewalks (WB)	6206	1		m^2	11171	32	360817
Entrance/Exit Ramps							
-- EB 1 Ramp	3261	3		m^2	11740	35	410886
-- WB 1 Ramp	3237	3		m^2	11653	35	407862
Eastbound Service Drive	3816	6		m^2	25567	35	894852
Westbound Service Drive	4048	6		m^2	27122	35	949256
Aggregate Base Under Conc. (9")				m^2	315633	6	1893799
Vehicular Bridges (X-overs)							
-- Chene							
Superstructure	51	20		m^2	1072	860	922144
Substructure				LSUM		32	34312
-- E. Grand Blvd.							
Superstructure	49	40		m^2	1998	860	1718228
Substructure				LSUM		32	63934
-- Lucky St.							
Superstructure	54	12		m^2	670	860	576011
Substructure				LSUM		32	21433
-- Saginaw							
Superstructure	48	24		m^2	1191	860	1024019
Substructure				LSUM		32	38103
-- Mt. Elliot							
Superstructure	51	20		m^2	1066	860	916803
Substructure				LSUM		32	34114
-- Harper							
Superstructure	51	12		m^2	632	860	543486
Substructure				LSUM		32	20223
-- Concord							
Superstructure	51	20		m^2	1060	860	911462
Substructure				LSUM		32	33915
-- Frontenac							
Superstructure	51	18		m^2	968	860	832205
Substructure				LSUM		32	30966
-- Van Dyke							
Superstructure	50	29		m^2	1491	860	1282578
Substructure				LSUM		32	47724
-- Burns							
Superstructure	50	18		m^2	958	860	824078
Substructure				LSUM		32	30663
-- McClellan							
Superstructure	68	17		m^2	1209	860	1039663
Substructure				LSUM		32	38685

Figure A-1
Segment C
Grand Trunk Railroad to Conner

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
-- Gratiot							
Superstructure	115	30		m^2	3532	860	3037434
Substructure				LSUM		32	113021
-- Cadillac							
Superstructure	56	20		m^2	1159	860	996912
Substructure				LSUM		32	37094
-- French Rd.							
Superstructure	52	18		m^2	983	860	845208
Substructure				LSUM		32	31450
-- Conner							
Superstructure	42	18		m^2	781	860	672013
Substructure				LSUM		32	42210
-- West Conner Bridge							
Superstructure	51	15		m^2	787	860	677130
Substructure				LSUM		32	25196
-- East Conner Bridge							
Superstructure	67	15		m^2	1018	860	875824
Substructure				LSUM		32	32589
I-94 Mainline Bridges							
-- Conrail RR (Mt. Elliot)							
Superstructure	103	48		m^2	5056	860	4347885
Substructure				LSUM		32	161782
-- Conrail RR (Conner)							
Superstructure	115	30		m^2	3532	860	3037434
Substructure				LSUM		32	113021
Pedestrian Bridges							
N/A							
Railroad Bridges							
N/A							
Retaining Walls							
-- Retaining wall surface (MSE wall)	12412	6	50%	m^2	37857	485	18360451
-- Barriers							
Median - double face (0.4m3/m)	6206			m^3	2435	390	949616
(EB) - single face (0.36 m^3/m)	3261		50%	m^3	588	390	229129
(WB) - single face (0.36 m^3/m)	3237			m^3	583	390	227443
Subtotal Pavements							60140359
Earthwork							
-- Excavation	6206			m^3	132411	5	728262
-- Embankment				m^3			0
-- Subbase				m^3			0
Subtotal Earthwork							728262
Pump Station (15000)				EACH	1		150000
Pump Station (15200)				EACH	1		175000
Pump Station (21875)				EACH	1		200000
Total Major Items							71663647

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Add in Other Construction Items							
-- Signing				LSUM	12	3750	46500
-- Stripping				LSUM	130225	1	171897
-- Traffic Signals				LSUM	13	15K	195000
-- Intelligent Transportation Systems (ITS)	12412			LFT	12412	625	7757500
-- Utilities				LFT			10896000
Highway Lighting							
-- Mainline				LSUM			140250
-- Service Drives				LSUM			229625
-- Restoration/Landscaping				LSUM			12500
Total Other Construction							19449272
Total Items + Other Construction							**91112919**
Add Percentage for Contingency			20%				18222584
Total Items + Other Construction + Contingency							**109335502**
Add Percentage for Traffic Control			15%				16400325
Mobilization			10%				10933550
Total Items + Other Construction + Contingency +Traffic Control							**125735828**
Add Percentage for Mobilization (5-10%)			10%				12573583
Grand Total Segment C							**$138,309,411**

Figure A-1
Segment C
Grand Trunk Railroad to Conner (cont.)

Appendix A
DEIS
Cost Estimate for Enhanced No-Build Alternative

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Estimate Major Items							
Removals							
-- Mainline Pavement (SB)	3490	11		m^2	38390	6	230340
-- Mainline Pavement (NB)	3490	11		m^2	38390	6	230340
-- Auxiliary Lane Pavement (SB)	1400	3		m^2	5040	6	30240
-- Auxiliary Lane Pavement (NB)	1625	3		m^2	5850	6	35100
-- Shoulders -mainline (L+R) SB	3490	7		m^2	25128	6	150768
-- Shoulders -mainline (L+R) NB	3490	7		m^2	25128	6	150768
-- Curb & Gutter (SB)	3490		200%	m	6980	39	272220
-- Curb & Gutter (NB)	3490		200%	m	6980	39	272220
-- Sidewalks (SB)	3490	1		m^2	6282	4	25128
-- Sidewalks (NB)	3490	1		m^2	6282	4	25128
Entrance/Exit Ramps							
-- SB 1 Ramp (incl. shoulders)	2620	9		m^2	24104	6	144624
-- NB 1 Ramp (incl. shoulders)	2465	9		m^2	22678	6	136068
Southbound Service Drive	4400	3		m^2	15840	6	95040
Northbound Service Drive	2760	3		m^2	9936	6	59616
Vehicular Bridges (X-overs)							
-- Euclid	60	21		m^2	1260	248	312480
-- Seward	60	21		m^2	1260	248	312480
-- Pallister	60	10		m^2	600	248	148800
-- West Grand	50	38		m^2	1900	248	471200
-- Milwaukee	55	14		m^2	770	248	190960
-- Warren	60	35		m^2	2100	248	520800
-- Forrest	60	16		m^2	960	248	238080
I-94 Mainline Bridges							
-- SB M-10 / I-94	400	18		m^2	7200	248	1785600
-- NB M-10 / I-94	400	18		m^2	7200	248	1785600
Pedestrian Bridges							
-- Holden	80	3		m^2	288	140	40320
-- Wayne State	140	3		m^2	504	140	70560
-- Canfield	85	3		m^2	306	140	42840
Railroad Bridges							
Grand Trunk Western - North	300	12		m^2	3660	140	512400
Grand Trunk Western - South	300	12		m^2	3660	140	512400
Subtotal Removals							8802120
New Construction							
Pavements							
-- Mainline Pavement (SB)	3490	3		m^2	12564	35	439740
-- Mainline Pavement (NB)	3490	3		m^2	12564	35	439740
-- Auxiliary Lane Pavement (SB)	1400	3		m^2	5040	32	161280
-- Auxiliary Lane Pavement (NB)	1625	3		m^2	5850	32	187200
-- Shoulders -mainline (L+R) SB	3490	7		m^2	25128	35	879480
-- Shoulders -mainline (L+R) NB	3490	7		m^2	25128	35	879480
-- Curb & Gutter (SB)	3490		200%	LFT	6980	32	228944
-- Curb & Gutter (NB)	3490		200%	LFT	6980	32	228944
-- Sidewalks (SB)	3490	1		m^2	6282	32	202909
-- Sidewalks (NB)	3490	1		m^2	6282	32	202909
Entrance/Exit Ramps							
-- SB 1 Ramp (incl. shoulders)	2620	5		m^2	14410	35	504350
-- NB 1 Ramp (incl. shoulders)	2465	5		m^2	13558	35	474513
Southbound Service Drive	4400	3		m^2	15840	35	554400
Northbound Service Drive	2760	3		m^2	9936	35	347760
-- Aggregate Base Under Conc. (9")				m^2	140018	6	840105
Vehicular Bridges (X-overs)							
-- Euclid							
Superstructure	60	21		m^2	1260	860	1083600
Substructure				LSUM		32	40320
-- Seward							
Superstructure	60	21		m^2	1260	860	1083600
Substructure				LSUM		32	40320
-- Pallister							
Superstructure	60	10		m^2	600	860	516000
Substructure				LSUM		32	19200
-- West Grand							
Superstructure	50	38		m^2	1900	860	1634000
Substructure				LSUM		32	60800
-- Milwaukee							
Superstructure	55	14		m^2	770	860	662200
Substructure				LSUM		32	24640
-- Warren							
Superstructure	60	35		m^2	2100	860	1806000
Substructure				LSUM		32	67200
-- Forrest							
Superstructure	60	16		m^2	960	860	825600
Substructure				LSUM		32	30720
I-94 Mainline Bridges							
-- SB M-10 / I-94							
Superstructure	400	18		m^2	7200	860	6192000
Substructure				LSUM		32	230400
-- NB M-10 / I-94							
Superstructure	400	18		m^2	7200	860	6192000
Substructure				LSUM		32	230400
Pedestrian Bridges							
-- Holden							
Superstructure	80	3		m^2	288	860	247680
Substructure				LSUM		32	9216
-- Wayne State							
Superstructure	140	3		m^2	504	860	433440
Substructure				LSUM		32	16128
-- Canfield							
Superstructure	85	3		m^2	306	860	263160
Substructure				LSUM		32	9792

Figure A-1
Segment D
M-10, Gladstone Street to Willis Street

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Railroad Bridges							
-- Grand Trunk Western - North							
Superstructure	300	12		m^2	3660	860	3147600
Substructure				LSUM		32	117120
-- Grand Trunk Western - South							
Superstructure	300	12		m^2	3660	860	3147600
Substructure				LSUM		32	117120
Retaining Walls							
-- Retaining wall surface (MSE Walls)	6980	6		m^2	16752	485	8124720
-- Barriers							
Median - double face (0.4m3/m)	3490			m^3	1369	390	534025
(EB) - single face (0.36 m^3/m)	2620		50%	m^3	472	390	184090
(WB) - single face (0.36 m^3/m)	2465		50%	m^3	444	390	173199
Subtotal Pavements							43835643
Earthwork							
-- Excavation	3490			m^3	74463	5	409545
Subtotal Earthwork							409545
Pump Station (15000)				EACH	1		150000
Pump Station (15200)				EACH	1		175000
Pump Station (21875)				EACH	1		200000
Total Major Items							53572307
Add in Other Construction Items							
-- Signing				LSUM	7	3750	26100
-- Stripping				LSUM	52125	1	68805
-- Traffic Signals				LSUM	13	15K	195000
-- Intelligent Transportation Systems (ITS)	3490			LFT	6980	625	4362500
-- Utilities				LFT			3976418
Highway Lighting							
-- Mainline				LSUM			78875
-- Service Drives				LSUM			129150
-- Restoration/Landscaping				LSUM			10000
Total Other Construction							8846848
Total Items + Other Construction							**62419155**
Add Percentage for Contingency			20%				12483831
Total Items + Other Construction + Contingency							**74902986**
Add Percentage for Traffic Control			15%				11235448
Mobilization			10%				7490299
Total Items + Other Construction +Contingency+Traffic Control							**86138434**
Add Percentage for Mobilization (5-10%)			10%				8613843
Grand Total Segment D							**$94,752,278**

Figure A-1
Segment D
M-10 Gladstone Street to Willis Street (cont.)

Appendix A
DEIS
Cost Estimate for Enhanced No-Build Alternative

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Estimate Major Items							
Removals							
-- Mainline Pavement (SB)	3090	11		m^2	33990	6	203940
-- Mainline Pavement (NB)	3090	11		m^2	33990	6	203940
-- Auxiliary Lane Pavement (SB)	2505	3		m^2	9018	6	54108
-- Auxiliary Lane Pavement (NB)	2285	3		m^2	8226	6	49356
-- Shoulders -mainline (L+R) SB	3090	7		m^2	22248	6	133488
-- Shoulders -mainline (L+R) NB	3090	7		m^2	22248	6	133488
-- Curb & Gutter (SB)	3090		200%	m	6180	39	241020
-- Curb & Gutter (NB)	3090		200%	m	6180	39	241020
-- Sidewalks (SB)	1500	1		m^2	2700	4	10800
-- Sidewalks (NB)	1500	1		m^2	2700	4	10800
Entrance/Exit Ramps							
-- SB 1 Ramp	1005	9		m^2	9246	6	55476
-- NB 1 Ramp	1745	9		m^2	16054	6	96324
-- SB 2 Ramps	1310	12					
-- NB 2 Ramps	850	12					
-- Southbound Service Drive	1700	7		m^2	12240	6	73440
-- Northbound Service Drive	1640	7		m^2	11808	6	70848
Vehicular Bridges (X-overs)							
-- Clay	70	30		m^2	2100	248	520800
-- West Grand	100	30		m^2	3000	248	744000
-- Milwaukee	75	18		m^2	1350	248	334800
-- Ferry	135	18		m^2	2430	248	602640
-- Warren	75	50		m^2	3750	248	930000
-- Canfield	75	18		m^2	1350	248	334800
-- SB Ramp to Warren	50	9		m^2	460	248	114080
-- NB Ramp from Warren	70	9		m^2	644	248	159712
-- WB I-94 to SB I-75	320	13		m^2	4256	248	1055488
-- EB I-94 to NB I-75	125	9		m^2	1150	248	285200
-- NB I-75 to WB I-94	275	9		m^2	2530	248	627440
-- SB I-75 to EB I-94	200	9		m^2	1840	248	456320
I-94 Mainline Bridges							
-- SB I-75 over I-94	100	18		m^2	1800	248	446400
-- NB I-75 over I-94	100	18		m^2	1800	248	446400
Pedestrian Bridges							
N/A				m^2	0	140	0
Railroad Bridges							
-- Grand Trunk Western Spur - North	80	12		m^2	960	248	238080
-- Grand Trunk Western Spur - South	80	18		m^2	1440	248	357120
Subtotal Removals							9231328
New Construction							
Pavements							
-- Mainline Pavement (SB)	3090	10		m^2	33372	35	1168020
-- Mainline Pavement (NB)	3090	10		m^2	33372	35	1168020
-- Auxiliary Lane Pavement (SB)	3090	3	50%	m^2	5562	32	177984
-- Auxiliary Lane Pavement (NB)	3090	3	50%	m^2	5562	32	177984
-- Shoulders -mainline (L+R) SB	3090	7		m^2	22248	35	778680
-- Shoulders -mainline (L+R) NB	3090	7		m^2	22248	35	778680
-- Curb & Gutter (SB)	3090		200%	LFT	6180	32	202704
-- Curb & Gutter (NB)	3090		200%	LFT	6180	32	202704
-- Sidewalks (SB)	3090	1		m^2	5562	32	179653
-- Sidewalks (NB)	3090	1		m^2	5562	32	179653

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Entrance/Exit Ramps							
-- SB 1 Ramp	1005	9		m^2	9246	35	323610
-- NB 1 Ramp	1745	9		m^2	16054	35	561890
-- SB 2 Ramps	1310	12					
-- NB 2 Ramps	850	12					
Southbound Service Drive	1700	7		m^2	16768	35	586880
Northbound Service Drive	1640	7		m^2	10880	35	380800
-- Aggregate Base Under Conc. (9")				m^2	175312	6	1051872
Vehicular Bridges (X-overs)							
-- Clay							
Superstructure	70	30		m^2	2100	860	1806000
Substructure				LSUM		32	67200
-- West Grand							
Superstructure	100	30		m^2	3000	860	2580000
Substructure				LSUM		32	96000
-- Milwaukee							
Superstructure	75	18		m^2	1350	860	1161000
Substructure				LSUM		32	43200
-- Ferry							
Superstructure	135	18		m^2	2430	860	2089800
Substructure				LSUM		32	77760
-- Warren							
Superstructure	75	50		m^2	3750	860	3225000
Substructure				LSUM		32	120000
-- Canfield							
Superstructure	75	18		m^2	1350	860	1161000
Substructure				LSUM		32	43200
-- SB Ramp to Warren							
Superstructure	50	9		m^2	460	860	395600
Substructure				LSUM		32	14720
-- NB Ramp from Warren							
Superstructure	70	9		m^2	644	860	553840
Substructure				LSUM		32	20608
-- WB I-94 to SB I-75							
Superstructure	320	13		m^2	4256	860	3660160
Substructure				LSUM		32	136192
-- EB I-94 to NB I-75							
Superstructure	125	9		m^2	1150	860	989000
Substructure				LSUM		32	36800
-- NB I-75 to WB I-94							
Superstructure	275	9		m^2	2530	860	2175800
Substructure				LSUM		32	80960
-- SB I-75 to EB I-94							
Superstructure	200	9		m^2	1840	860	1582400
Substructure				LSUM		32	58880
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
N/A							

Figure A-1
Segment E
I-75, Philadelphia Street to Wallick Street

DEIS Cost Estimate for Enhanced No-Build Alternative by Segment

Items	Length (m)	Width (m)	Pct	Unit of Measure	Number of Units	Unit Cost	Total Cost
Railroad Bridges							
-- Grand Trunk Western Spur - North							
Superstructure	80	12		m^2	960	860	825600
Substructure				LSUM		32	30720
-- Grand Trunk Western Spur - South							
Superstructure	200	80	18	m^2	16000	860	13760000
Substructure				LSUM		32	512000
Retaining Walls							
-- Retaining wall surface (MSE Walls)	6180	20	100%	m^2	123600	485	59946000
-- Barriers							
Median - double face (0.4cm/m)	6180			m^3	2425	390	945637
(EB) - single face (0.36 m^3/m)	2300		50%	m^3	414	390	161606
(WB) - single face (0.36 m^3/m)	2500		50%	m^3	450	390	175658
Subtotal Pavements							106451475
Earthwork							
-- Excavation	3090			m^3	65928	5	362605
Subtotal Earthwork							362605
Pump Station (15000)				EACH	1		150000
Pump Station (15200)				EACH	1		175000
Pump Station (21875)				EACH	1		200000
Total Major Items							116570408
Add in Other Construction Items							
-- Signing				LSUM	6	3750	23175
-- Stripping				LSUM	42240	1	55757
-- Traffic Signals				LSUM	6	15K	90000
-- Intelligent Transportation Systems (ITS)	6180			m	6180	625	3862500
-- Utilities				m			5040000
Highway Lighting							
-- Mainline				LSUM			70000
-- Service Drives				LSUM			114500
-- Restoration/Landscaping				LSUM			10000
Total Other Construction							9265932
Total Items + Other Construction							**125836340**
Add Percentage for Contingency			20%				25167268
Total Items + Other Construction + Contingency							**151003608**
Add Percentage for Traffic Control			15%				22650541
Mobilization			10%				15100361
Total Items + Other Construction + Contingency +Traffic Control							**173654149**
Add Percentage for Mobilization (5-10%)			10%				17365415
Grand Total Segment E							**$191,019,564**

Figure A-1
Segment E
I-75, Philadelphia Street to Wallick Street (cont.)

VE of Enhanced No-Build Alternative

DEIS Cost Estimate for Enhanced No-Build Alternative (By Item)

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Intelligent Transportation Systems							
-- Intelligent Transportation Systems (ITS)	5328			m	5328	625	3,330,000
-- Intelligent Transportation Systems (ITS)	4792			m	4792	625	2,995,000
-- Intelligent Transportation Systems (ITS)	12412			LFT	12412	625	7757500
-- Intelligent Transportation Systems (ITS)	3490			LFT	6980	625	4362500
-- Intelligent Transportation Systems (ITS)	6180			m	6180	625	3862500
Intelligent Transportation Systems							**$22,307,500**
Utilities							
-- Utilities (est. from Davison bids)				m			3,976,418
-- Utilities				m			3,976,418
-- Utilities				LFT			10896000
-- Utilities				LFT			3976418
-- Utilities				m			5040000
Utilities							**$27,865,254**
Highway Lighting							
-- Mainline				LSUM			120,400
-- Service Drives				LSUM			197,135
-- Mainline				LSUM			119,635
-- Service Drives				LSUM			196,370
-- Mainline				LSUM			140250
-- Service Drives				LSUM			229625
-- Mainline				LSUM			78875
-- Service Drives				LSUM			129150
-- Mainline				LSUM			70000
-- Service Drives				LSUM			114500
Highway Lighting							**$1,395,940**
Restoration/Landscaping							
-- Restoration/Landscaping				LSUM			11,000
-- Restoration/Landscaping				LSUM			10,000
-- Restoration/Landscaping				LSUM			12500
-- Restoration/Landscaping				LSUM			10000
-- Restoration/Landscaping				LSUM			10000
Restoration/Landscaping							**$53,500**

Subtotal - Major + Other Construction Items		**$385,716,517.79**
Contingency	20%	**$77,143,303.56**
Subtotal - Major + Other Construction Items Contingency		**$462,859,821.35**
Traffic Control	15%	**$69,428,973.20**
Mobilization	10%	**$4,498,18.009**
Subtotal - Major + Other Construction Items Contingency + Traffic Control + Mobilization		**$536,786,983.55**
Add'l for Mobilization	10%	$53,678,698.36
SUBTOTAL		**$590,465,681.91**
ENGINEERING		**$147,616,407.00**
GRAND TOTAL		**$738,082,089**

Figure A-2
Summary of DEIS Cost Estimate

DEIS Cost Estimate for Enhanced No-Build Alternative (By Item)

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Mainline and Ramp Pavement Removals							
-- Mainline Pavement (EB)	2664	11		m^2	29304	6	175,824
-- Mainline Pavement (WB)	2664	11		m^2	29304	6	175,824
-- Auxiliary Lane Pavement (EB)	2664	3	50%	m^2	4795	6	28,771
-- Auxiliary Lane Pavement (WB)	2664	3	50%	m^2	4795	6	28,771
-- Shoulders - mainline (L+R) EB	2664	4		m^2	12521	6	75,125
-- Shoulders - mainline (L+R) WB	2664	4		m^2	12521	6	75,125
Entrance/Exit Ramps							
-- EB 1 Ramp	971	3		m^2	3496	6	20,974
-- WB 1 Ramp	1032	3		m^2	3715	6	22,291
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps	268	7		m^2	1956	6	11,738
Pavements							
Mainline Pavement							
-- EB 3 Lanes	2664	10		m^2	28771	35	1,006,992
-- WB 3 Lanes	2664	10		m^2	28771	35	1,006,992
-- Auxiliary Lane Pavement (EB)	2664	3	50%	m^2	4795	32	153,446
-- Auxiliary Lane Pavement (WB)	2664	3	50%	m^2	4795	32	153,446
-- Shoulders - mainline (L+R) EB	2664	4		m^2	12521	35	438,228
-- Shoulders - mainline (L+R) WB	2664	4		m^2	12521	35	438,228
Entrance/Exit Ramps							
-- EB 1 Ramp	971	3		m^2	3496	35	122,346
-- WB 1 Ramp	1032	3		m^2	3715	35	130,032
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps	268	7		m^2	1930	35	67,536
Removals							
-- Mainline Pavement (EB)	2396	11		m^2	26356	6	158,136
-- Mainline Pavement (WB)	2396	11		m^2	26356	6	158,136
-- Auxiliary Lane Pavement (EB)	2396	3	50%	m^2	4312	6	25,877
-- Auxiliary Lane Pavement (WB)	2396	3	50%	m^2	4312	6	25,877
-- Shoulders -mainline (L+R) EB	2396	4		m^2	11261	6	67,567
-- Shoulders -mainline (L+R) WB	2396	4		m^2	11261	6	67,567
Entrance/Exit Ramps							
-- EB 1 Ramp	1536	3		m^2	5529	6	33,178
-- WB 1 Ramp	1250	3		m^2	4500	6	27,000
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps (N/A)		7					
Pavements							
-- Mainline Pavement (EB)	2396	10		m^2	25876	35	905,688
-- Mainline Pavement (WB)	2396	10		m^2	25876	35	905,688
-- Auxiliary Lane Pavement (EB)	2396	3	50%	m^2	4312	32	138,010
-- Auxiliary Lane Pavement (WB)	2396	3	50%	m^2	4312	32	138,010
-- Shoulders -mainline (L+R) EB	2396	4		m^2	11261	35	394,142
-- Shoulders -mainline (L+R) WB	2396	4		m^2	11261	35	394,142
Entrance/Exit Ramps							
-- EB 1 Ramp	1536	3		m^2	5530	35	193,561
-- WB 1 Ramp	1250	3		m^2	4500	35	157,500
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps (N/A)							
Removals							
-- Mainline Pavement (EB)	6206	11		m^2	68266	6	409596
-- Mainline Pavement (WB)	6206	11		m^2	68266	6	409596
-- Auxiliary Lane Pavement (EB)	6206	3	50%	m^2	11171	6	67025
-- Auxiliary Lane Pavement (WB)	6206	3	50%	m^2	11171	6	67025
-- Shoulders -mainline (L+R) EB	6206	4		m^2	29168	6	175009
-- Shoulders -mainline (L+R) WB	6206	4		m^2	29168	6	175009
Entrance/Exit Ramps							
-- EB 1 Ramp	3261	3		m^2	11740	6	70438
-- WB 1 Ramp	3237	3		m^2	11653	6	69919
-- EB 2 Ramps (N/A)							
-- WB 2 Ramps (N/A)							
Pavements							
-- Mainline Pavement (EB)	6206	11		m^2	68266	35	2389310
-- Mainline Pavement (WB)	6206	11		m^2	68266	35	2389310
-- Auxiliary Lane Pavement (EB)	6206	3	50%	m^2	22342	32	714931
-- Auxiliary Lane Pavement (WB)	6206	3	50%	m^2	22342	32	714931
-- Shoulders -mainline (L+R) EB	6206	4		m^2	29168	35	1020887
-- Shoulders -mainline (L+R) WB	6206	4		m^2	29168	35	1020887
Entrance/Exit Ramps							
-- EB 1 Ramp	3261	3		m^2	11740	35	410886
-- WB 1 Ramp	3237	3		m^2	11653	35	407862
Removals							
-- Mainline Pavement (SB)	3490	11		m^2	38390	6	230340
-- Mainline Pavement (NB)	3490	11		m^2	38390	6	230340
-- Auxiliary Lane Pavement (SB)	1400	3		m^2	5040	6	30240
-- Auxiliary Lane Pavement (NB)	1625	3		m^2	5850	6	35100
-- Shoulders -mainline (L+R) SB	3490	7		m^2	25128	6	150768
-- Shoulders -mainline (L+R) NB	3490	7		m^2	25128	6	150768
Entrance/Exit Ramps							
-- SB 1 Ramp (incl. shoulders)	2620	9		m^2	24104	6	144624
-- NB 1 Ramp (incl. shoulders)	2465	9		m^2	22678	6	136068
Pavements							
-- Mainline Pavement (SB)	3490	3		m^2	12564	35	439740
-- Mainline Pavement (NB)	3490	3		m^2	12564	35	439740
-- Auxiliary Lane Pavement (SB)	1400	3		m^2	5040	32	161280
-- Auxiliary Lane Pavement (NB)	1625	3		m^2	5850	32	187200
-- Shoulders -mainline (L+R) SB	3490	7		m^2	25128	35	879480
-- Shoulders -mainline (L+R) NB	3490	7		m^2	25128	35	879480
Entrance/Exit Ramps							
-- SB 1 Ramp (incl. shoulders)	2620	5		m^2	14410	35	504350
-- NB 1 Ramp (incl. shoulders)	2465	5		m^2	13558	35	474513
Removals							
-- Mainline Pavement (SB)	3090	11		m^2	33990	6	203940
-- Mainline Pavement (NB)	3090	11		m^2	33990	6	203940
-- Auxiliary Lane Pavement (SB)	2505	3		m^2	9018	6	54108
-- Auxiliary Lane Pavement (NB)	2285	3		m^2	8226	6	49356
-- Shoulders -mainline (L+R) SB	3090	7		m^2	22248	6	133488
-- Shoulders -mainline (L+R) NB	3090	7		m^2	22248	6	133488
Entrance/Exit Ramps							
-- SB 1 Ramp	1005	9		m^2	9246	6	55476
-- NB 1 Ramp	1745	9		m^2	16054	6	96324
-- SB 2 Ramps	1310	12					
-- NB 2 Ramps	850	12					
Pavements							
-- Mainline Pavement (SB)	3090	10		m^2	33372	35	1168020
-- Mainline Pavement (NB)	3090	10		m^2	33372	35	1168020
-- Auxiliary Lane Pavement (SB)	3090	3	50%	m^2	5562	32	177984
-- Auxiliary Lane Pavement (NB)	3090	3	50%	m^2	5562	32	177984
-- Shoulders -mainline (L+R) SB	3090	7		m^2	22248	35	778680
-- Shoulders -mainline (L+R) NB	3090	7		m^2	22248	35	778680

Figure A-2
DEIS Cost Estimate

DEIS Cost Estimate for Enhanced No-Build Alternative (By Item)

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Entrance/Exit Ramps							
-- SB 1 Ramp	1005	9		m^2	9246	35	323610
-- NB 1 Ramp	1745	9		m^2	16054	35	561890
-- SB 2 Ramps	1310	12					
-- NB 2 Ramps	850	12					
Mainline and Ramp Pavement - Removal and Reconstruction							**$29,573,408**
Earthwork							
-- Excavation	2664			m^3	56839	6	315,457
-- Embankment				m^3			0
-- Excavation	2396			m^3	51121	6	283,722
-- Embankment				m^3			0
-- Excavation	6206			m^3	132411	5	728262
-- Embankment				m^3			0
-- Excavation	3490			m^3	74463	5	409545
-- Excavation	3090			m^3	65928	5	362605
Earthwork							**$2,099,590**
Aggregate Base Under Concrete							
-- Aggregate Base Under Conc. (9")				m^2	121893	6	731358
-- Aggregate Base Under Conc. (9")				m^2	103796	6	622776
Aggregate Base Under Conc. (9")				m^2	315633	6	1893798
-- Aggregate Base Under Conc. (9")				m^2	140018	6	840108
-- Aggregate Base Under Conc. (9")				m^2	175318	6	1051908
Aggregate Base							**$5,139,948**
Mainline and Ramp Pavement - Removal and Reconstruction							*29573408*
Earthwork							*2099590*
Aggregate Base Under Concrete							*5139948*
Concrete Pavement							**$36,812,946**
Service Drives (Asphalt Pavement)							
-- Eastbound Service Drive	1341	6		m^2	8985	6	53,908
-- Westbound Service Drive	299	6		m^2	2003	6	12,020
-- Eastbound Service Drive	1341	6		m^2	8985	35	314,465
-- Westbound Service Drive	299	6		m^2	2003	35	70,116
-- Eastbound Service Drive	768	6		m^2	5145	6	30,874
-- Westbound Service Drive	853	6		m^2	5715	6	34,291
-- Eastbound Service Drive	768	6		m^2	5146	35	180,119
-- Westbound Service Drive	853	6		m^2	5717	35	200,122
-- Eastbound Service Drive	3816	6		m^2	25567	6	153,403
-- Westbound Service Drive	4048	6		m^2	27122	6	162,730
Eastbound Service Drive	3816	6		m^2	25567	35	894,852
Westbound Service Drive	4048	6		m^2	27122	35	949,256
Southbound Service Drive	4400	3		m^2	15840	6	95,040
Northbound Service Drive	2760	3		m^2	9936	6	59,616
Southbound Service Drive	4400	3		m^2	15840	35	554,400
Northbound Service Drive	2760	3		m^2	9936	35	347,760
-- Southbound Service Drive	1700	7		m^2	12240	6	73,440
-- Northbound Service Drive	1640	7		m^2	11808	6	70,848
Southbound Service Drive	1700	7		m^2	16768	35	586,880
Northbound Service Drive	1640	7		m^2	10880	35	380,800
Asphalt Pavement (Service Drive)							**$5,224,939**

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Curb & Gutter							
A							
-- Curb & Gutter (EB)	2664		200%	m	5328	39	207,792
-- Curb & Gutter (WB)	2664		200%	m	5328	39	207,792
-- Curb & Gutter (EB)	2664		200%	m	5328	33	174,758
-- Curb & Gutter (WB)	2664		200%	m	5328	33	174,758
B							
-- Curb & Gutter (EB)	2396		200%	m	4792	5	23,960
-- Curb & Gutter (WB)	2396		200%	m	4792	5	23,960
-- Curb & Gutter (EB)	2396		200%	m	4792	33	157,178
-- Curb & Gutter (WB)	2396		200%	m	4792	33	157,178
C							
-- Curb & Gutter (EB)	6206		200%	m	12412	39	484,068
-- Curb & Gutter (WB)	6206		200%	m	12412	39	484,068
-- Curb & Gutter (EB)	6206		200%	m	12412	32	407,114
-- Curb & Gutter (WB)	6206		200%	m	12412	32	407,114
M10							
-- Curb & Gutter (SB)	3490		200%	m	6980	39	272,220
-- Curb & Gutter (NB)	3490		200%	m	6980	39	272,220
-- Curb & Gutter (SB)	3490		200%	LFT	6980	32	228,944
-- Curb & Gutter (NB)	3490		200%	LFT	6980	32	228,944
I-75							
-- Curb & Gutter (SB)	3090		200%	m	6180	39	241,020
-- Curb & Gutter (NB)	3090		200%	m	6180	39	241,020
-- Curb & Gutter (SB)	3090		200%	LFT	6180	32	202,704
-- Curb & Gutter (NB)	3090		200%	LFT	6180	32	202,704
Curb & Gutter							**$4,799,515**

Figure A-2
DEIS Cost Estimate (cont.)

DEIS Cost Estimate for Enhanced No-Build Alternative (By Item)

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Sidewalk							
-- Sidewalks (EB)	2664	1		m^2	4795	4	19,181
-- Sidewalks (WB)	2664	1		m^2	4795	4	19,181
-- Sidewalks (EB)	2664	1		m^2	4795	32	154,885
-- Sidewalks (WB)	2664	1		m^2	4795	32	154,885
-- Sidewalks (EB)	2396	3		m^2	7188	4	28,752
-- Sidewalks (WB)	2396	3		m^2	7188	4	28,752
-- Sidewalks (EB)	2396	3		m^2	7188	32	232,172
-- Sidewalks (WB)	2396	3		m^2	7188	32	232,172
-- Sidewalks (EB)	6206	1		m^2	11171	4	44,683
-- Sidewalks (WB)	6206	1		m^2	11171	4	44,683
-- Sidewalks (EB)	6206	1		m^2	11171	32	360,817
-- Sidewalks (WB)	6206	1		m^2	11171	32	360,817
-- Sidewalks (SB)	3490	1		m^2	6282	4	25,128
-- Sidewalks (NB)	3490	1		m^2	6282	4	25,128
-- Sidewalks (SB)	3490	1		m^2	6282	32	202,909
-- Sidewalks (NB)	3490	1		m^2	6282	32	202,909
-- Sidewalks (SB)	1500	1		m^2	2700	4	10,800
-- Sidewalks (NB)	1500	1		m^2	2700	4	10,800
-- Sidewalks (SB)	3090	1		m^2	5562	32	179,653
-- Sidewalks (NB)	3090	1		m^2	5562	32	179,653
Sidewalk							**$2,517,959**
Retaining Walls							
-- Retaining wall surface (0.6m x 1.2m)	5328	6	50%	m^2	16250	485	7,881,444
-- Retaining wall surface (0.6m x 1.2m)	4792	6	100%	m^2	29231	485	14,177,132
-- Retaining wall surface (MSE wall)	12412	6	50%	m^2	37857	485	18,360,451
-- Retaining wall surface (MSE Walls)	6980	6		m^2	16752	485	8,124,720
-- Retaining wall surface (MSE Walls)	6180	20	100%	m^2	123600	485	59,946,000
Retaining Walls							**$108,489,747**
Median Barrier							
Median - double face (0.4cm/m)	2664			m^3	1045	390	407,634
Median - double face (0.4cm/m)	2396			m^3	940	390	366,626
Median - double face (0.4m3/m)	6206			m^3	2435	390	949616
Median - double face (0.4m3/m)	3490			m^3	1369	390	534025
Median - double face (0.4cm/m)	6180			m^3	2425	390	945637
Median Barrier							**$3,203,537**
Single Faced Barrier							
(EB) - single face (0.36 m^3/m)	1341		50%	m^3	242	390	94,223
(WB) - single face (0.36 m^3/m)	299		50%	m^3	54	390	21,009
(EB) - single face (0.36 m^3/m)	1536		50%	m^3	277	390	107,925
(WB) - single face (0.36 m^3/m)	1250		50%	m^3	225	390	87,829
(EB) - single face (0.36 m^3/m)	3261		50%	m^3	588	390	229129
(WB) - single face (0.36 m^3/m)	3237			m^3	583	390	227443
(EB) - single face (0.36 m^3/m)	2620		50%	m^3	472	390	184090
(WB) - single face (0.36 m^3/m)	2465		50%	m^3	444	390	173199
(EB) - single face (0.36 m^3/m)	2300		50%	m^3	414	390	161606
(WB) - single face (0.36 m^3/m)	2500		50%	m^3	450	390	175658
Single Faced Barrier							**$1,462,111**
Median Barrier							*3203537*
Single Faced Barrier							*1462110*
Concrete Wall Barrier							**$4,665,648**

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
Pump Stations							
Pump Station (8000 in gpm)				EACH	1		100,000
Pump Station (9000 in gpm)				EACH	1		150,000
Pump Station (12000 in gpm)				EACH	1		200,000
Pump Stations (N/A)				EACH			0
Pump Station (15000)				EACH	1		150000
Pump Station (15200)				EACH	1		175000
Pump Station (21875)				EACH	1		200000
Pump Station (15000)				EACH	1		150000
Pump Station (15200)				EACH	1		175000
Pump Station (21875)				EACH	1		200000
Pump Station (15000)				EACH	1		150000
Pump Station (15200)				EACH	1		175000
Pump Station (21875)				EACH	1		200000
Pump Stations							**$2,025,000**
Structure Removals							
-- Grand River	110	30		m^2	3300	248	818400
-- Linwood Ave.	53	19		m^2	1007	248	249736
-- 14th Street	53	25		m^2	1325	248	328600
-- Rosa Parks Blvd.	79	15		m^2	1185	248	293880
-- Trumbull	67	15		m^2	1005	248	249240
-- Third Street	134	12		m^2	1608	248	398784
-- Second Ave.	65	25		m^2	1625	248	403000
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
-- WSU Athletic Field	128	3		m^2	460	140	64512
Railroad Bridges							
-- GTW/Conrail	110	24		m^2	2684	495	1328580
Railroad Bridges Cont'd							
-- RR Spur (Rosa Parks)	55	18		m^2	990	495	490050
-- Cass Ave.	58	24		m^2	1415	248	350970
-- Woodward Ave.	73	24		m^2	1786	248	442948
-- John R.	52	19		m^2	995	248	246909
-- Brush	52	19		m^2	991	248	245966
-- Beaubien	53	19		m^2	1007	248	249736
-- Chene	51	20		m^2	1072	248	265920
I-94 Dequindre Bridge	823	36		m^2	30121	248	7470206
Pedestrian Bridges							
N/A							
Railroad Bridges							
N/A							
-- Chene	51	20		m^2	1072	248	265920
-- E. Grand Blvd.	49	40		m^2	1998	248	495489
-- Lucky St.	54	12		m^2	670	248	166105
-- Saginaw	48	24		m^2	1191	248	295299
-- Mt. Elliot	51	20		m^2	1066	248	264380
-- Harper	51	12		m^2	632	248	156726
-- Concord	51	20		m^2	1060	248	262840
-- Frontenac	51	18		m^2	968	248	239985
-- Van Dyke	50	29		m^2	1491	248	369860
-- Burns	50	18		m^2	958	248	237641
-- McClellan	68	17		m^2	1209	248	299810
-- Gratiot	115	30		m^2	3532	248	875911
-- Cadillac	56	20		m^2	1167	248	289535

Figure A-2
DEIS Cost Estimate (cont.)

DEIS Cost Estimate for Enhanced No-Build Alternative (By Item)

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
-- French Rd.	52	18		m^2	985	248	244203
-- Conner	42	18		m^2	781	248	193790
* West Bridge	51	15		m^2	787	248	195265
* East Bridge	67	15		m^2	1018	248	252563
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
-- Helen	52	3		m^2	190	140	26623
-- Townsend	57	3		m^2	211	140	29587
-- Seminole	67	3		m^2	245	140	34288
-- Rohns	54	3		m^2	200	140	28054
-- Garland	58	4		m^2	251	140	35151
-- Springfield	58	3		m^2	212	140	29740
-- Malcolm	67	3		m^2	245	140	34288
Railroad Bridges							
-- Conrail RR (Mt. Elliot)	103	48		m^2	5056	248	1253809
-- Conrail RR (Conner)	115	30		m^2	3532	248	875911
Vehicular Bridges (X-overs)							
-- Euclid	60	21		m^2	1260	248	312480
-- Seward	60	21		m^2	1260	248	312480
-- Pallister	60	10		m^2	600	248	148800
-- West Grand	50	38		m^2	1900	248	471200
-- Milwaukee	55	14		m^2	770	248	190960
-- Warren	60	35		m^2	2100	248	520800
-- Forrest	60	16		m^2	960	248	238080
I-94 Mainline Bridges							
-- SB M-10 / I-94	400	18		m^2	7200	248	1785600
-- NB M-10 / I-94	400	18		m^2	7200	248	1785600
Pedestrian Bridges							
-- Holden	80	3		m^2	288	140	40320
-- Wayne State	140	3		m^2	504	140	70560
-- Canfield	85	3		m^2	306	140	42840
Railroad Bridges							
Grand Trunk Western - North	300	12		m^2	3660	140	512400
Grand Trunk Western - South	300	12		m^2	3660	140	512400
Vehicular Bridges (X-overs)							
-- Clay	70	30		m^2	2100	248	520800
-- West Grand	100	30		m^2	3000	248	744000
-- Milwaukee	75	18		m^2	1350	248	334800
-- Ferry	135	18		m^2	2430	248	602640
-- Warren	75	50		m^2	3750	248	930000
-- Canfield	75	18		m^2	1350	248	334800
-- SB Ramp to Warren	50	9		m^2	460	248	114080
-- NB Ramp from Warren	70	9		m^2	644	248	159712
-- WB I-94 to SB I-75	320	13		m^2	4256	248	1055488
-- EB I-94 to NB I-75	125	9		m^2	1150	248	285200
-- NB I-75 to WB I-94	275	9		m^2	2530	248	627440
-- SB I-75 to EB I-94	200	9		m^2	1840	248	456320
I-94 Mainline Bridges							
-- SB I-75 over I-94	100	18		m^2	1800	248	446400
-- NB I-75 over I-94	100	18		m^2	1800	248	446400
Pedestrian Bridges							
N/A				m^2	0	140	0
Railroad Bridges							
-- Grand Trunk Western Spur - North	80	12		m^2	960	248	238080
-- Grand Trunk Western Spur - South	80	18		m^2	1440	248	357120
Structure Removals							**$35,948,011**
Replacement Bridges							
-- Grand River							
Superstructure	110	3		m^2	330	860	$283,800
Substructure				LSUM		32	$10,560
-- Linwood Ave.							
Superstructure	53	19		m^2	1007	860	$866,020
Substructure				LSUM		32	$26,010
-- 14th Street							
Superstructure	53	25		m^2	1325	860	$1,139,500
Substructure				LSUM		32	$24,825
-- Rosa Parks Blvd							
Superstructure	79	15		m^2	1185	860	$1,019,100
Substructure				LSUM		32	$39,000
-- Trumbull							
Superstructure	67	15		m^2	1005	860	$864,300
Substructure				LSUM		32	$33,000
-- Third Street							
Superstructure	134	12		m^2	1608	860	$1,382,880
Substructure				LSUM		32	$88,440
-- Second Ave.							
Superstructure	65	25		m^2	1625	860	$1,397,500
Substructure				LSUM		32	$42,915
I-94 Mainline Bridges							
N/A							
B- Pedestrian Bridges							
-- WSU Athletic Field	128	3		m^2	460	323	$148,838
Railroad Bridges							
-- GTW/Conrail							
Superstructure	110	10		m^2	1177	1722	$2,026,794
Substructure						64	$76,034
Vehicular Bridges (X-overs)							
-- Cass Ave.							
Superstructure	58	24		m^2	1415	861	$1,218,487
Substructure				LSUM		4	$5,661
-- Woodward Ave.							
Superstructure	73	24		m^2	1786	861	$1,537,815
Substructure				LSUM		4	$7,144
-- John R.							
Superstructure	52	18		m^2	990	861	$852,700
Substructure				LSUM		4	$3,961
-- Brush							
Superstructure	52	18		m^2	986	861	$849,445
Substructure				LSUM		4	$3,946
-- Beaubien							
Superstructure	53	18		m^2	1001	861	$862,464
Substructure				LSUM		4	$4,007
I-94 Dequindre Bridge							
Superstructure	823	36		m^2	30121	861	$25,934,870
Substructure				LSUM		4	$120,487
Pedestrian Bridges							
N/A							
Railroad Bridges							
N/A							

Figure A-2
DEIS Cost Estimate (cont.)

DEIS Cost Estimate for Enhanced No-Build Alternative (By Item)

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
C- Vehicular Bridges (X-overs)							
-- Chene							
Superstructure	51	20		m^2	1072	860	$922,144
Substructure				LSUM		32	$34,312
-- E. Grand Blvd.							
Superstructure	49	40		m^2	1998	860	$1,718,228
Substructure				LSUM		32	$63,934
-- Lucky St.							
Superstructure	54	12		m^2	670	860	$576,011
Substructure				LSUM		32	$21,433
-- Saginaw							
Superstructure	48	24		m^2	1191	860	$1,024,019
Substructure				LSUM		32	$38,103
-- Mt. Elliot							
Superstructure	51	20		m^2	1066	860	$916,803
Substructure				LSUM		32	$34,114
-- Harper							
Superstructure	51	12		m^2	632	860	$543,486
Substructure				LSUM		32	$20,223
-- Concord							
Superstructure	51	20		m^2	1060	860	$911,462
Substructure				LSUM		32	$33,915
-- Frontenac							
Superstructure	51	18		m^2	968	860	$832,205
Substructure				LSUM		32	$30,966
-- Van Dyke							
Superstructure	50	29		m^2	1491	860	$1,282,578
Substructure				LSUM		32	$47,724
-- Burns							
Superstructure	50	18		m^2	958	860	$824,078
Substructure				LSUM		32	$30,663
-- McClellan							
Superstructure	68	17		m^2	1209	860	$1,039,663
Substructure				LSUM		32	$38,685
-- Gratiot							
Superstructure	115	30		m^2	3532	860	$3,037,434
Substructure				LSUM		32	$113,021
-- Cadillac							
Superstructure	56	20		m^2	1159	860	$996,912
Substructure				LSUM		32	$37,094
-- French Rd.							
Superstructure	52	18		m^2	983	860	$845,208
Substructure				LSUM		32	$31,450
-- Conner							
Superstructure	42	18		m^2	781	860	$672,013
Substructure				LSUM		32	$42,210
-- West Conner Bridge							
Superstructure	51	15		m^2	787	860	$677,130
Substructure				LSUM		32	$25,196
-- East Conner Bridge							
Superstructure	67	15		m^2	1018	860	$875,824
Substructure				LSUM		32	$32,589

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
I-94 Mainline Bridges							
-- Conrail RR (Mt. Elliot)							
Superstructure	103	48		m^2	5056	860	$4,347,885
Substructure				LSUM		32	$161,782
-- Conrail RR (Conner)							
Superstructure	115	30		m^2	3532	860	$3,037,434
Substructure				LSUM		32	$113,021
Pedestrian Bridges							
N/A							
Railroad Bridges							
N/A							
M10- Vehicular Bridges (X-overs)							
-- Euclid							
Superstructure	60	21		m^2	1260	860	$1,083,600
Substructure				LSUM		32	$40,320
-- Seward							
Superstructure	60	21		m^2	1260	860	$1,083,600
Substructure				LSUM		32	$40,320
-- Pallister							
Superstructure	60	10		m^2	600	860	$516,000
Substructure				LSUM		32	$19,200
-- West Grand							
Superstructure	50	38		m^2	1900	860	$1,634,000
Substructure				LSUM		32	$60,800
-- Milwaukee							
Superstructure	55	14		m^2	770	860	$662,200
Substructure				LSUM		32	$24,640
-- Warren							
Superstructure	60	35		m^2	2100	860	$1,806,000
Substructure				LSUM		32	$67,200
-- Forrest							
Superstructure	60	16		m^2	960	860	$825,600
Substructure				LSUM		32	$30,720
I-94 Mainline Bridges							
-- SB M-10 / I-94							
Superstructure	400	18		m^2	7200	860	$6,192,000
Substructure				LSUM		32	$230,400
-- NB M-10 / I-94							
Superstructure	400	18		m^2	7200	860	$6,192,000
Substructure				LSUM		32	$230,400
Pedestrian Bridges							
-- Holden							
Superstructure	80	3		m^2	288	860	$247,680
Substructure				LSUM		32	$9,216
-- Wayne State							
Superstructure	140	3		m^2	504	860	$433,440
Substructure				LSUM		32	$16,128
-- Canfield							
Superstructure	85	3		m^2	306	860	$263,160
Substructure				LSUM		32	$9,792
Railroad Bridges							
-- Grand Trunk Western - North							
Superstructure	300	12		m^2	3660	860	$3,147,600
Substructure				LSUM		32	$117,120
-- Grand Trunk Western - South							
Superstructure	300	12		m^2	3660	860	$3,147,600
Substructure				LSUM		32	$117,120

Figure A-2
DEIS Cost Estimate (cont.)

VE of Enhanced No-Build Alternative

Appendix A
DEIS Cost Estimate for Enhanced No-Build Alternative

DEIS Cost Estimate for Enhanced No-Build Alternative (By Item)

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
I75- Vehicular Bridges (X-overs)							
-- Clay							
Superstructure	70	30		m^2	2100	860	$1,806,000
Substructure				LSUM		32	$67,200
-- West Grand							
Superstructure	100	30		m^2	3000	860	$2,580,000
Substructure				LSUM		32	$96,000
-- Milwaukee							
Superstructure	75	18		m^2	1350	860	$1,161,000
Substructure				LSUM		32	$43,200
-- Ferry							
Superstructure	135	18		m^2	2430	860	$2,089,800
Substructure				LSUM		32	$77,760
-- Warren							
Superstructure	75	50		m^2	3750	860	$3,225,000
Substructure				LSUM		32	$120,000
-- Canfield							
Superstructure	75	18		m^2	1350	860	$1,161,000
Substructure				LSUM		32	$43,200
-- SB Ramp to Warren							
Superstructure	50	9		m^2	460	860	$395,600
Substructure				LSUM		32	$14,720
-- NB Ramp from Warren							
Superstructure	70	9		m^2	644	860	$553,840
Substructure				LSUM		32	$20,608
-- WB I-94 to SB I-75							
Superstructure	320	13		m^2	4256	860	$3,660,160
Substructure				LSUM		32	$136,192
-- EB I-94 to NB I-75							
Superstructure	125	9		m^2	1150	860	$989,000
Substructure				LSUM		32	$36,800
-- NB I-75 to WB I-94							
Superstructure	275	9		m^2	2530	860	$2,175,800
Substructure				LSUM		32	$80,960
-- SB I-75 to EB I-94							
Superstructure	200	9		m^2	1840	860	$1,582,400
Substructure				LSUM		32	$58,880
I-94 Mainline Bridges							
N/A							
Pedestrian Bridges							
N/A							
Railroad Bridges							
-- Grand Trunk Western Spur - North							
Superstructure	80	12		m^2	960	860	$825,600
Substructure				LSUM		32	$30,720
-- Grand Trunk Western Spur - South							
Superstructure	200	80	18	m^2	16000	860	$13,760,000
Substructure				LSUM		32	$512,000
Replacement Bridges							**$132,452,749**
Subtotal - MAJOR ITEMS							**$332,936,514**

Item	Length (m)	Width (m)	Pct.	Unit of Measure	Quantity	Unit Price	Extension
OTHER ITEMS							
Signing							
-- Signing				LSUM	5	3,750	19,875
-- Signing				LSUM	5	3,750	18,113
-- Signing				LSUM	12	3750	46500
-- Signing				LSUM	7	3750	26100
-- Signing				LSUM	6	3750	23175
Signing							**$133,763**
Striping							
-- Striping				LSUM	14567	1	19,228
-- Stripping				LSUM	13909	1	18,360
-- Stripping				LSUM	130225	1	171897
-- Stripping				LSUM	52125	1	68805
-- Stripping				LSUM	42240	1	55757
Striping							**$334,047**
Traffic Signals							
-- Traffic Signals				LSUM	8	15K	120,000
-- Traffic Signals				LSUM	6	15K	90,000
-- Traffic Signals				LSUM	13	15K	195000
-- Traffic Signals				LSUM	13	15K	195000
-- Traffic Signals				LSUM	6	15K	90000
Traffic Signals							**$690,000**

Figure A-2
DEIS Cost Estimate (cont.)

DEIS Updated Cost Estimate for Enhanced No-Build Alternative (June 2004)

Enhanced No-Build (Auxiliary Lanes along I-94)

Traditional - Opinion of Cost

Base Cost	$336,464,692	+ Wall repair/reconstruction $5 mill
Traffic Control	$50,469,704	15% of Base Cost
Enhancement	$13,458,588	4% of Base Cost
Contingencies	$100,098,246	(Base + TC + Enhancem't) x 25%
Utilities	$33,646,469	10% of Base Cost
Mobilization	$33,646,469	10% of Base Cost
ROW	$1,000,000	
Enginnering	$125,122,807	(Base + TC + Enhm't+ Contingency) x 25%
Total Cost	$693,906,975	

Base Costs

Item	Cost
Enhance Safety Walls 15 ft	$55,279,333
Pavement Remove & Repalce	$24,898,977
Bridge Removal	$35,544,040
Bridge Construction	$172,483,350
Drainage	$2,258,992
Signing	$18,000,000
Lighting	$10,000,000
Pump Station Rehab.	$3,000,000
Landscaping	$10,000,000
Base Cost	$331,464,692

Enhance Safety

Auxiliary lane pavt (12' wide) Cost

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway	
Earth Excavation 3'	cu yd	$5	36	$7	
Sub Base 12"	cu yd	$13	12	$6	
Aggregate Base 4"	sq yd	$5	12	$2	
Pavement and Shoulder	sq yd	$50	12	$22	
Pavement Marking	ft	$0	2	$1	
Drainage	ft	$30	1	$30	
Total/ft				$67	
Cost/1500 feet Aux Lane				$1,004,167	per aux lane

Total pavt cost Auxiliary lanes		# Aux Lanes	Unit Cost	Total Pavt $
		20	$1,004,167	$20,083,333

Additional Bridge Length Cost Auxiliary Lane

	Deck Area	Cost sq ft	Cost/Aux	# Aux lanes	Total Bridge $
Bridge	1,680	$110	$184,800	20	$3,696,000

Assume 2 Bridges per 1500 feet Auxiliary lane
70 feet wide @ 12 feet wide

Retaining Wall Cost/	Cost (sq ft)	Wall Hght	Cost/ft	Cost of 1500'	15' Wall $
Retaining Wall	$70	15	$1,050	$1,575,000	$31,500,000

Mainline Auxiliary Lane Cost

Pavt/Wall and Bridge cost		$55,279,333

Allowances for 20 feet high wall

	Cost(sq ft)	Wall Hght	Cost/ft	Cost/1500 ft	20' Wall $
Retaining Wall	$70	20	$1,400	$2,100,000	$42,000,000

Allowance =$10,500,000

DEIS Updated Cost Estimate for Enhanced No-Build Alternative (June 2004)

Pavement

Mainline Replacement

Section I: BOP to M-10 (Eastbound)

For a 10' outside shldr, 3-12' lanes, 4' inside shldr, and a 3' median for one side of the mainlane

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 4.5'	cu yd	$6	239	$53
Sub Base 12"	cu yd	$13	53	$25
Aggregate Base 4"	sq yd	$8	53	$15
Pavement and Shoulder (PCC)	sq yd	$40	53	$79
Pavement Marking	ft	$0	4	$1
Removal of Surface	sq yd	$5	53	$10
Single Face Barrier	ft	$75	1	$75
Double Face Barrier	ft	$75	1	$75
Total/ft				$332
Total/mile				$1,750,809
Total Cost (1.26 miles)				$2,203,764

Section II: M-10 to I-75 (Eastbound)

For a 10' outside shldr, 3-12' lanes, 4' inside shldr, and a 3' median for one side of the mainlane

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 4.5'	cu yd	$6	239	$53
Sub Base 12"	cu yd	$13	53	$25
Aggregate Base 4"	sq yd	$8	53	$15
Pavement and Shoulder (PCC)	sq yd	$40	53	$79
Pavement Marking	ft	$0	4	$1
Removal of Surface	sq yd	$5	53	$10
Single Face Barrier	ft	$75	1	$75
Double Face Barrier	ft	$75	1	$75
Total/ft				$332
Total/mile				$1,750,809
Total Cost (1.16 miles)				$2,034,321

Section III: I-75 to EOP (Eastbound)

For a 10' outside shldr, 3-12' lanes, 4' inside shldr, and a 3' median for one side of the mainlane

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$6	159	$35
Sub Base 12"	cu yd	$13	53	$25
Aggregate Base 4"	sq yd	$8	53	$15
Pavement and Shoulder (PCC)	sq yd	$40	53	$79
Pavement Marking	ft	$0	4	$1
Removal of Surface	sq yd	$5	53	$10
Single Face Barrier	ft	$75	1	$75
Double Face Barrier	ft	$75	1	$75
Total/ft				$314
Total/mile				$1,657,529
Total Cost (4.4 miles)				$7,293,127

Section I: BOP to M-10 (Westbound)

For a 10' outside shldr, 3-12' lanes, and a 4' inside shldr

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 4.5'	cu yd	$6	225	$50
Sub Base 12"	cu yd	$13	50	$23
Aggregate Base 4"	sq yd	$8	50	$14
Pavement and Shoulder (PCC)	sq yd	$40	50	$74
Pavement Marking	ft	$0	4	$1
Removal of Surface	sq yd	$5	50	$9
Single Face Barrier	ft	$75	1	$75
Total/ft				$246
Total/mile				$1,300,836
Total Cost (1.26 miles)				$1,637,377

Section II: BOP to M-10 (Westbound)

For a 10' outside shldr, 3-12' lanes, and a 4' inside shldr

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$6	150	$33
Sub Base 12"	cu yd	$13	50	$23
Aggregate Base 4"	sq yd	$8	50	$14
Pavement and Shoulder (PCC)	sq yd	$40	50	$74
Pavement Marking	ft	$0	4	$1
Removal of Surface	sq yd	$5	50	$9
Single Face Barrier	ft	$75	1	$75
Total/ft				$230
Total/mile				$1,212,836
Total Cost (1.16 miles)				$1,409,232

Section III: I-75 to EOP (Westbound)

For a 10' outside shldr, 3-12' lanes, and a 4' inside shldr

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$6	150	$33
Sub Base 12"	cu yd	$13	50	$23
Aggregate Base 4"	sq yd	$8	50	$14
Pavement and Shoulder (PCC)	sq yd	$40	50	$74
Pavement Marking	ft	$0	4	$1
Removal of Surface	sq yd	$5	50	$9
Single Face Barrier	ft	$75	1	$75
Total/ft				$230
Total/mile				$1,212,836
Total Cost (4.4 miles)				$5,336,476

Total Pavement Mainline Replacement Cost $19,914,298

DEIS Updated Cost Estimate for Enhanced No-Build Alternative (June 2004)

I-75 Ramps

For a 40 foot combined lane and shoulder width

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$6	120	$27
Sub Base 12"	cu yd	$13	40	$19
Aggregate Base 4"	sq yd	$8	40	$11
Pavement and Shoulder (PCC)	sq yd	$40	40	$59
Pavement Marking	ft	$0	2	$1
Removal of Surface	sq yd	$5	40	$7
Total/ft				$123
Total/mile				$651,884
Total Cost (3.29 miles)				$2,142,082

Mainline Ramps

For a 24 foot combined lane and shoulder width

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$6	72	$16
Sub Base 12"	cu yd	$13	24	$11
Aggregate Base 4"	sq yd	$8	24	$7
Pavement and Shoulder (PCC)	sq yd	$40	24	$36
Pavement Marking	ft	$0	2	$1
Removal of Surface	sq yd	$5	24	$4
Total/ft				$74
Total/mile				$392,187
Total Cost (1200 ramp length and 31 total ramps)				$2,763,133

M-10 Ramps

For a 36 foot average roadway width and total length of 6624 ft

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$6	108	$24
Sub Base 12"	cu yd	$13	36	$17
Aggregate Base 4"	sq yd	$8	36	$10
Pavement and Shoulder (PCC)	sq yd	$40	36	$53
Pavement Marking	ft	$0	2	$1
Removal of Surface	sq yd	$5	36	$7
Total/ft				$111
Total/mile				$586,960
Total Cost				$736,368

M-10 Ramps

For a 40 foot combined lane and shoulder width

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$6	120	$27
Sub Base 12"	cu yd	$13	40	$19
Aggregate Base 4"	sq yd	$8	40	$11
Pavement and Shoulder (PCC)	sq yd	$40	40	$59
Pavement Marking	ft	$0	2	$1
Removal of Surface	sq yd	$5	40	$7
Total/ft				$123
Total/mile				$651,884
Total Cost (3.02 miles)				$1,968,740

I-75 Ramps

For a 36 foot average Ramp width and total length of 10371 ft

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$6	108	$24
Sub Base 12"	cu yd	$13	36	$17
Aggregate Base 4"	sq yd	$8	36	$10
Pavement and Shoulder (PCC)	sq yd	$40	36	$53
Pavement Marking	ft	$0	2	$1
Removal of Surface	sq yd	$5	36	$7
Total/ft				$111
Total/mile				$586,960
Total Cost				$1,152,910

Pavements	Total Cost
I-75 Ramps	$989,173
M-10 Ramps	$1,232,372
Mainline Ramps	$2,763,133
Mainline	$19,914,298
Total	$24,898,977

DEIS Updated Cost Estimate for Enhanced No-Build Alternative (June 2004)

Bridge Removal

I-94

Section I (B.O.P. to Cass)

	Deck Area (sq.ft.)	Unit Cost	Cost
Grand River	37,400	$25	$935,000
Linwood	18,400	$25	$460,000
14th St.	21,300	$25	$532,500
CN & CSA	48,000	$45	$2,160,000
Rosa Parks	13,000	$25	$325,000
Trumbull	29,400	$25	$735,000
3rd	43,800	$25	$1,095,000
2nd	22,600	$25	$565,000
Pedestrian Bridge	6,400	$15	$96,000
		Subtotal =	$6,903,500

Section II (Cass to Chene)

	Deck Area (sq.ft.)	Unit Cost	Cost
Cass Ave.	22,100	$25	$552,500
Woodward Ave.	48,600	$25	$1,215,000
John R.	20,200	$25	$505,000
Brush	15,600	$25	$390,000
Beaubien	11,200	$25	$280,000
Chene	17,670	$25	$441,750
		Subtotal	$3,384,250

Section III (Chene to EOP)

	Deck Area	Unit Cost	Cost
E. Grand Blvd.	36,400	$25	$910,000
Lucky St.	13,950	$25	$348,750
Saginaw	17,470	$25	$436,750
Mt. Elliot	22,960	$25	$574,000
Harper	9,538	$25	$238,450
Concord	17,226	$25	$430,650
Frontenac	14,210	$25	$355,250
Van Dyke	33,920	$25	$848,000
Burns	15,100	$25	$377,500
McClellan	25,760	$25	$644,000
Gratiot	55,000	$25	$1,375,000
Cadillac	19,221	$25	$480,525
French Rd.	19,698	$25	$492,450
Conner	47,050	$25	$1,176,250
Helen	2,637	$15	$39,555
Townsend	3,170	$15	$47,550
Seminole	3,063	$15	$45,945
Rohns	3,776	$15	$56,640
Springfield	3,520	$15	$52,800
Malcolm	3,157	$15	$47,355
Conrail RR (Mt. Elliot)	7,570	$45	$340,650
Conrail RR (Conner)	14,286	$45	$642,870
		Subtotal	$9,960,940

M-10

	Deck Area	Unit Cost	Cost
SB M-10 / I-94	65,800	$25	$1,645,000
NB M-10 / I-94	70,500	$25	$1,762,500
EB I-94 to NB M-10	49,896	$25	$1,247,400
WB I-94 to SB M-10	52,248	$25	$1,306,200
		Subtotal	$5,961,100

I-75

	Deck Area	Unit Cost	Cost
WB I-94 to SB I-75	79,200	$25	$1,980,000
EB I-94 to NB I-75	36,200	$25	$905,000
NB I-75 to WB I-94	63,000	$25	$1,575,000
SB I-75 to EB I-94	44,550	$25	$1,113,750
WB I-94 over I-75	63,135	$25	$1,578,375
EB I-94 over I-75	87,285	$25	$2,182,125
		Subtotal	$9,334,250

Bridge Removal Total $35,544,040

DEIS Updated Cost Estimate for Enhanced No-Build Alternative (June 2004)

Bridge Construction

I-94 Bridges

Section I (B.O.P. to Cass)

	Deck Area (sq.ft.)	Unit Cost	Cost
Grand River	37,400	$110	$4,114,000
Linwood Ave.	18,400	$110	$2,024,000
14th Street	21,300	$110	$2,343,000
Rosa Parks Blvd	13,000	$110	$1,430,000
Trumbull	29,400	$110	$3,234,000
Third Street	43,800	$110	$4,818,000
Second Ave.	22,600	$110	$2,486,000
WSU Athletic Field	22,600	$110	$2,486,000
CN/CSA	48,000	$300	$14,400,000
Pedestrian Bridge	6,400	$80	$512,000
		Subtotal	$37,847,000

Section II (Cass to Chene)

	Deck Area	Unit Cost	Cost
Cass Ave.	22,100	$110	$2,431,000
Woodward Ave.	48,600	$110	$5,346,000
John R.	20,200	$110	$2,222,000
Brush	15,600	$110	$1,716,000
Beaubien	11,200	$110	$1,232,000
Chene	17,670	$110	$1,943,700
		Subtotal	$14,890,700

Section III (Chene to EOP)

	Deck Area	Unit Cost	Cost
E. Grand Blvd.	36,400	$110	$4,004,000
Lucky St.	13,950	$110	$1,534,500
Saginaw	17,470	$110	$1,921,700
Mt. Elliot	22,960	$110	$2,525,600
Harper	9,538	$110	$1,049,180
Concord	17,226	$110	$1,894,860
Frontenac	14,210	$110	$1,563,100
Van Dyke	33,920	$110	$3,731,200
Burns	15,100	$110	$1,661,000
McClellan	25,760	$110	$2,833,600
Gratiot	55,000	$110	$6,050,000
Cadillac	19,221	$110	$2,114,310
French Rd.	19,698	$110	$2,166,780
Conner	47,050	$110	$5,175,500
Helen (Ped. Bridge)	2,637	$80	$210,960

	Deck Area	Unit Cost	Cost
Townsend (Ped. Bridge)	3,170	$80	$253,600
Seminole (Ped. Bridge)	3,063	$80	$245,040
Rohns (Ped. Bridge)	3,776	$80	$302,080
Springfield (Ped. Bridge)	3,520	$80	$281,600
Malcolm (Ped. Bridge)	3,157	$80	$252,560
Conrail RR (Mt. Elliot)	7,570	$300	$2,271,000
Conrail RR (Conner)	14,286	$300	$4,285,800
		Subtotal =	$46,327,970

Total Non-Interchange Bridges	$99,065,670

M-10

	Deck Area	Unit Cost	Cost
SB M-10 over I-94	65,800	$120	$7,896,000
NB M-10 over I-94	70,500	$120	$8,460,000
EB I-94 to NB M-10	49,896	$120	$5,987,520
WB I-94 to SB M-10	52,248	$120	$6,269,760
		Subtotal	$28,613,280

I-75

	Deck Area	Unit Cost	Cost
WB I-94 to SB I-75	79,200	$120	$9,504,000
EB I-94 to NB I-75	36,200	$120	$4,344,000
NB I-75 to WB I-94	63,000	$120	$7,560,000
SB I-75 to EB I-94	44,550	$120	$5,346,000
WB I-94 over I-75	63,135	$120	$7,576,200
EB I-94 over I-75	87,285	$120	$10,474,200
		Subtotal	$44,804,400

Total Interchnage Bridges	$73,417,680

Bridge Total	$172,483,350

Drainage

For a 300' lateral spacing and 70' lateral length X 2

Laterals 18" RCP				
		Unit Cost	Quantity	Cost
	Mainline	$45	16,755	$753,984
		Subtotal =		**$753,984**

DROP INLETS (every 300' on ML)				
		Quantity	Unit Cost	Cost
	Mainline	479	$750	$359,040
		Subtotal =		**$359,040**

Catch Basins			
	Quantity	Unit Cost	Cost
Mainline	479	$1,100	$526,592
	Subtotal =		**$526,592**

Drainage Sub-Total	$1,639,616

Drainage Repairs

Manholes			
	Quantity	Unit Cost	Cost
Mainline	166	$1,800	$299,376
	Subtotal =		**$299,376**

RCP			
	Length	Unit Cost	Cost
Mainline (60")	2000	$160	$320,000
	Subtotal =		**$320,000**

Drainage Total	$2,258,992

Appendix C
Detailed Cost Estimate of DEIS Build Alternative

Summary of Costs - Build Alternative (DEIS)

ITEM NUMBER	ITEM	UNIT	UNIT COST	QUANTITY & TOTAL COST	
				QTY.	COST
1	ASPHALT PAVEMENT (6/12 SECTION)	sq. yd.	$11.70	333,170	$ 3,898,092.12
2	CONCRETE PAVEMENT (12/12 SECTION)	sq. yd.	$90.00	770,093	$ 69,308,410.00
3	3" MILL & OVERLAY	sq. yd.	$9.00	68,442	$ 615,981.00
4	REMOVAL OF SURFACING	sq. yd.	$1.70	1,247,543	$ 2,120,822.83
5	CURB & GUTTER	ft.	$7.65	206,080	$ 1,576,509.71
6	SIDEWALK	sq. ft.	$2.50	530,714	$ 1,326,785.00
7	CONCRETE MEDIAN PAVEMENT	sq. ft.	$3.40	129,700	$ 440,980.00
8	BRIDGES	sq. ft.	* N/A	N/A	$ 141,022,850.00
9	RETAINING WALLS	sq. ft.	$60.00	343,114	$ 20,586,850.80
10	REMOVAL OF STRUCTURES	lump sum	lump sum	1	$ 19,876,000.00
11	SIGNALS	per inters.	$100,000.00	52	$ 5,200,000.00
12	LIGHTING	lump sum	lump sum	1	$ 10,000,000.00
13	SIGNING	lump sum	lump sum	1	$ 13,000,000.00
14	STRIPING	lump sum	lump sum	1	$ 241,290.00
15	RR CROSSING	per xing	$100,000.00	4	$ 400,000.00
16	DRAINAGE	lump sum	lump sum	1	$ 22,219,375.00
17	PUMP STATIONS	each	$2,000,000.00	6	$ 12,000,000.00
18	CONCRETE WALL BARRIER	ft.	$90.00	150,000	$ 13,500,000.00
19	LANDSCAPING	lump sum	lump sum	1	$ 8,000,000.00
				SUBTOTAL COST=	**$345,333,946.45**
				UTILITIES (15%) =	**$51,800,091.97**
				TRAFFIC CONTROL (15%) =	**$59,570,105.76**
				CONTINGENCY (25%) =	**$114,176,036.05**
				MOBILIZATION (10%) =	**$57,088,018.02**
				ENHANCEMENT (10%)=	**$62,796,819.82**
				SUBTOTAL COST =	**$690,765,018.07**
				ENGINEERING (25%)=	**$172,691,254.52**
				ROW=	**$50,000,000.00**
				GRAND TOTAL IN 2001 DOLLARS=	**$913,456,272.59**
	* UNIT COST FOR INTERCHANGE BRIDGES IS $120/sf * UNIT COST FOR RAILROAD BRIDGES IS $175/sf * UNIT COST FOR BRIDGES OTHER THAN INTERCHANGE AND RAILROAD IS $80/sf				
				GRAND TOTAL IN 2002 DOLLARS =	**$959,129,000.00**
				GRAND TOTAL IN 2004 DOLLARS =	**$1,057,440,000.00**

Exhibit 4.1

Cost by Section - Build Alternative (DEIS)

Project Location	Cost (in millions)
Conner Interchange and Service Drives Conner to Springfield	$ 8.88
Gratiot Interchange and Service Drives Bewick to Rohns	$ 9.03
Service Drives from Harper to Mt. Elliott	$ 3.26
M-10 Interchange (including service drives)	$ 198.87
I-75 Interchange (including service drives)	$ 191.08
Remainder of service drives from I-75 to east end of project	$ 46.25
Service drives from M-10 to I-75	$ 18.19
Service drives from east of I-96 to M-10	$ 21.40
Bridges from east of I-96 to M-10	$ 17.41
Bridges from M-10 to I-75	$ 32.45
Bridges from I-75 to Conner	$ 79.97
Mainline from east of I-96 to M-10 (minus bridges in the section)	$ 52.23
Mainline from M-10 to I-75 (minus bridges in the section)	$ 57.68
Mainline from I-75 to Conner (minus bridges in the section)	$ 169.93
ROW	$ 52.50
Total Cost of Mod 1 Estimated in 2002 dollars	**$ 959.13**
Total Cost of Mod 1 Estimated in 2004 dollars	**$ 1,057.44**

Exhibit 4.2

The VE team identified the following elements as having the largest impact on the project cost:

- Mainline
- Interchange at M-10
- Interchange at I-75
- Bridges
- Retaining walls
- Drainage
- Service drives

The VE study focused on these elements.

Paving Quantities

Iten Number	2	1	3	1	3
	Concrete	6"/12" Paving Section			
	Mainline	East Service		West Service	
	PCCP (sq. ft.)	Asphalt Pavement (sq. ft.)	Mill & Overlay (sq. ft.)	Asphalt Pavement (sq. ft.)	Mill & Overlay (sq. ft.)
BOP to M-10	1,174,846	203,590.80		224,429.10	
M10 to I-75	1,203,838	200,105.85		204,336.30	
I-75 to Mt. Elliott	794,111	283,531.50		441,966.00	69,814
Mt. Elliott to Van Dyke	762,592	64,102.50	121,475	114,243.15	75,392
Van Dyke to Gratiot	664,975	84,243.60	69,536	54,847.80	100,218
Gratoit to Conner	1,020,232	120,208.20	111,620	145,542.60	67,926
M-10	1,025,115	270,540.00			
I-75	285,132	217,015.00	*same as service road paving section		
Mr. Elliott	-	40,597.00			
Van Dyke	-	22,000.00			
Gratiot	-	64,010.00			
Conner	-	243,223.00			
SUBTOTAL(SF)	6,930,841	1,813,167.45	302,631	1,185,364.95	313,350
	PCCP	AP	MILL/OVLY		
TOTALS (SF)	6,930,841	2,998,532.40	615,981		
TOTALS (SY)	770,093	333,170.27	68,442		
Items	2	1	3		

Paving Quantities
Items 1, 2, & 3

REMOVAL OF SURFACING	
Location	Quantity (sq. ft.)
BOP to M-10	1,072,473
M-10 to I-75	1,078,451
I-75 to Mt. Elliott	1,255,619
Mt. Elliott to Van Dyke	756,070
Van Dyke to Gratiot	677,245
Gratiot to EOP	1,022,806
M-10	1,644,196
I-75 To Mt. Elliott	694,693
Cross Streets	
Minor Cross Streets	288,000
Grand	190,733
Mt. Elliott	20,000
Gratiot	40,555
Conner	53,943
Service Roads	
Eastbound	1,230,912
Westbound	1,202,190
TOTAL	**11,227,886**

1,247,543 sq. yd.

Removal of Surfacing
Item 4

	Length (ft.)
Eastbound Service	
EBF-BOP to M-10	15,119.28
EBF-M-10 to I-75	14,319.18
EBF-I-75 to Mt. Elliott	12,842.85
EBF-MT. Elliot to Van Dyke	7,318.16
EBF-Van Dyke to Gratiot	7,381.36
EBF-Gratiot to Conner	11,157.31
Westbound Service	
WBF-BOP to M-10	17,330.27
WBF-M-10 to I-75	13,317.22
WBF- I-75 to Mt. Elliott	29,295.88
WBF- Mt. Elliott to Van Dyke	8,070.21
WBF- Van Dyke to Gratiot	5,168.41
WBF- Gratiot to Conner	11,983.19
Interchanges	
M-10	20,751.61
I-75	16,353.43
Mt. Elliott	3,309.86
Van Dyke	426.14
Gratiot	1,921.14
Conner	10,014.20
Total	**206,080**

Curb and Gutter Quantities
Item 5

Note:
B.O.P - Beginning of Project
E.O.P - End of Project

Appendix C
Detailed Cost Estimate of DEIS Build Alternative

Appendix C
Detailed Cost Estimate of DEIS Build Alternative

SIDEWALK QUANTITIES			
Section I (B.O.P. to M10)			
	Length	**Width**	**Area (sq.ft.)**
Linwood	107	6	642
Linwood	535	8	4,280
Frontage Rd.	1,110	6	6,660
14th St.	107	6	642
14th St.	520	8	4,160
Frontage Rd.	2,090	6	12,540
Rosa Parks	105	6	630
Rosa Parks	525	8	4,200
Frontage Rd.	2,305	6	13,830
Trumbull	661	6	3,966
Trumbull	540	12	6,480
Frontage Rd.	1,720	6	10,320
Subtotal			**68,350**
Section II (M-10 Interchange)			
	Length	**Width**	**Area (sq.ft.)**
M-10	10,210	6	61,260
Warren	130	6	780
Warren	465	8	3,720
Subtotal			**65,760**
Section III (M-10 to I-75)			
	Length	**Width**	**Area (sq.ft.)**
3rd. St.	408	6	2,448
3rd. St.	1,525	12	18,300
Frontage Rd.	1,568	6	9,408
2nd St.	38	6	228
2nd St.	981	12	12,332
Frontage Rd.	206	6	1,236
Cass	627	12	7,802
Frontage Rd.	967	6	5,802
Woodward	109	6	654
Woodward	539	12	6,468
Frontage Rd.	775	6	4,650
John R.	74	6	444
John R.	803	8	6,424
Frontage Rd.	637	6	3,822
Brush	107	6	642
Brush	793	8	6,344
Beaubien	76	6	456
Beaubien	815	8	6,520
Frontage Rd.	1,119	6	6,714
Subtotal			**100,694**

Section IV (I-75 Interchange)			
	Length	**Width**	**Area (sq.ft.)**
I-75 Interchange	9,933	6	59,598
Milwaukee	567	6	3,402
Subtotal			**63,000**
Section V (I-75 to E.O.P.)			
	Length	**Width**	**Area (sq.ft.)**
Russell	794	6	4,764
Frontage Rd.	3,853	6	23,118
St. Aubins	1,001	6	6,006
Frontage Rd.	1,636	6	9,816
Chene	485	6	2,910
Chene	516	8	4,128
Frontage Rd.	1,018	6	6,108
Grand	3,078	6	18,468
Grand	574	8	4,592
Frontage Rd.	2,151	6	12,906
Mt. Elliot	949	6	5,694
Frontage Rd.	1,739	6	10,434
Concord	76	6	456
Concord	433	8	3,464
Frontage Rd.	501	6	3,006
Harper	107	6	642
Harper	436	8	3,488
Van Dyke	193	6	1,158
Van Dyke	523	8	4,184
Frontage Rd.	704	6	4,224
Burns	138	6	828
Burns	447	8	3,576
Frontage Rd.	2,756	6	16,536
Gratiot	777	6	4,662
Gratiot	467	8	3,736
McClellan	243	6	1,458
Frontage Rd.	2,745	6	16,470
French	224	6	1,344
French	496	8	3,968
Frontage Rd.	3,101	6	18,606
Conner	4,639	6	27,834
Harper	721	6	4,326
Subtotal			**232,910**
Total			**530,714**

Sidewalk Quantities
Item 6

Section I (B.O.P. to M-10)			
	Deck Area (sq.ft.)	**Unit Cost**	**Cost**
Linwood	13100	$ 80.00	$ 1,048,000.00
14th St.	14970	$ 80.00	$ 1,197,600.00
Rosa Parks	14590	$ 80.00	$ 1,167,200.00
Trumbull	22960	$ 80.00	$ 1,836,800.00
Subtotal			**$ 5,249,600.00**
Section II (M-10 Interchange)			
	Deck Area (sq.ft.)	**Unit Cost**	**Cost**
I-94			
East to South	36720	$ 120.00	$ 4,406,400.00
East to North	44330	$ 120.00	$ 5,319,600.00
West to South	44870	$ 120.00	$ 5,384,400.00
West to North	40145	$ 120.00	$ 4,817,400.00
M-10			
North to West	45745	$ 120.00	$ 5,489,400.00
North to East	13320	$ 120.00	$ 1,598,400.00
South to East	38800	$ 120.00	$ 4,656,000.00
South to West	12820	$ 120.00	$ 1,538,400.00
Mainline	40510	$ 120.00	$ 4,861,200.00
North Service	10105	$ 120.00	$ 1,212,600.00
South Service	9860	$ 120.00	$ 1,183,200.00
3rd Ave	29760	$ 120.00	$ 3,571,200.00
Subtotal			**$ 44,038,200.00**
Section III (M-10 to I-75)			
	Deck Area (sq.ft.)	**Unit Cost**	**Cost**
2nd St.	21690	$ 80.00	$ 1,735,200.00
Cass	15990	$ 80.00	$ 1,279,200.00
Woodward	24150	$ 80.00	$ 1,932,000.00
John R.	17580	$ 80.00	$ 1,406,400.00
Brush	22240	$ 80.00	$ 1,779,200.00
Beaubien	17680	$ 80.00	$ 1,414,400.00
Subtotal			**$ 9,546,400.00**
Section IV (I-75 Interchange)			

	Deck Area (sq.ft.)	**Unit Cost**	**Cost**
I-94			
East to North	71040	$ 120.00	$ 8,524,800.00
West to South	81990	$ 120.00	$ 9,838,800.00
M-10			
North	45745	$ 120.00	$ 5,489,400.00
N. & S. to West	47020	$ 120.00	$ 5,642,400.00
N. & S. to East	48445	$ 120.00	$ 5,813,400.00
South	12475	$ 120.00	$ 1,497,000.00
South Service	3550	$ 120.00	$ 426,000.00
East Service	2480	$ 120.00	$ 297,600.00
East Service	13515	$ 120.00	$ 1,621,800.00
I-94	48840	$ 120.00	$ 5,860,800.00
West Service	8535	$ 120.00	$ 1,024,200.00
North	5010	$ 120.00	$ 601,200.00
I-94	102765	$ 120.00	$ 12,331,800.00
Subtotal			**$ 58,969,200.00**
Section V (I-75 to E.O.P.)			
	Deck Area (sq.ft.)	**Unit Cost**	**Cost**
Chene	16600	$ 80.00	$ 1,328,000.00
E. Grande	23310	$ 80.00	$ 1,864,800.00
Mt. Elliott	25130	$ 80.00	$ 2,010,400.00
Conrail R.R.	12100	$ 175.00	$ 2,117,500.00
Concord	13380	$ 80.00	$ 1,070,400.00
Frontenac	12780	$ 80.00	$ 1,022,400.00
Ped. Bridge	7290	$ 80.00	$ 583,200.00
Van Dyke	16660	$ 80.00	$ 1,332,800.00
Ped. Bridge	5170	$ 80.00	$ 413,600.00
Burns	13380	$ 80.00	$ 1,070,400.00
Ped. Bridge	7200	$ 80.00	$ 576,000.00
Gratiot	34075	$ 80.00	$ 2,726,000.00
Garland	13870	$ 80.00	$ 1,109,600.00
French	13240	$ 80.00	$ 1,059,200.00
Springfield	13050	$ 80.00	$ 1,044,000.00
Conrail R.R.	11250	$ 175.00	$ 1,968,750.00
Conner Ave.	24030	$ 80.00	$ 1,922,400.00
Subtotal			**$ 23,219,450.00**
Bridge Total			**$ 141,022,850.00**

Bridge Quantities
Item 8

Section I (B.O.P. to M-10)					
	Length	**Avg. Height**	**Area (sq.ft.)**	**Unit Cost**	**Cost**
Eastbound	4,595	8.2	37,679	$60.00	$2,260,740.00
Westbound	3,980	8.6	34,228	$60.00	$2,053,680.00
Subtotal	**8,575**		**71,907**		**$4,314,420.00**
Section II (M-10 Interchange)					
	Length	**Avg. Height**	**Area (sq.ft.)**	**Unit Cost**	**Cost**
Northbound	2,083	9.5	19,789	$60.00	$1,187,310.00
Southbound	1,350	8	10,800	$60.00	$648,000.00
I-94	664	10.5	6,972	$60.00	$418,320.00
Subtotal	**4,097**		**37,561**		**$2,253,630.00**
Section III (M-10 to I-75)					
	Length	**Avg. Height**	**Area (sq.ft.)**	**Unit Cost**	**Cost**
Eastbound	2,977	7.5	22,328	$60.00	$1,339,650.00
Westbound	2,190	8	17,520	$60.00	$1,051,200.00
Subtotal	**5,167**		**39,848**		**$2,390,850.00**
Section IV (I-75 Interchange)					
	Length	**Avg. Height**	**Area (sq.ft.)**	**Unit Cost**	**Cost**
Northbound	765	14.5	11,093	$60.00	$665,550.00
Southbound	818	13.5	11,043	$60.00	$662,580.00
Subtotal	**1,583**		**22,136**		**$1,328,130.00**
Section V (I-75 to E.O.P.)					
	Length	**Avg. Height**	**Area (sq.ft.)**	**Unit Cost**	**Cost**
Eastbound	570	9.5	5,415	$60.00	$324,900.00
Eastbound	2344.6	6.8	15,943	$60.00	$956,596.80
Eastbound	3200	8.7	27,840	$60.00	$1,670,400.00
Eastbound	3820	8.1	30,942	$60.00	$1,856,520.00
Westbound	570	9.5	5,415	$60.00	$324,900.00
Westbound	4780	8	38,240	$60.00	$2,294,400.00
Westbound	2900	7	20,300	$60.00	$1,218,000.00
Westbound	3362	8.2	27,568	$60.00	$1,654,104.00
Subtotal	**21,547**		**171,664**		**$10,299,820.80**
Wall Total	**40,969**		**343,116**		**$20,586,850.80**

Retaining Wall Quantities
Item 9

Appendix C
Detailed Cost Estimate of DEIS Build Alternative

Appendix C
Detailed Cost Estimate of DEIS Build Alternative

Section I (B.O.P. to M10)			
	Deck Area (sq.ft.)	Unit Cost	Cost
Linwood	13,500	$ 25.00	$ 337,500
14th St.	19,500	$ 25.00	$ 487,500
Rosa Parks	5,750	$ 25.00	$ 143,750
Trumbull	17,550	$ 25.00	$ 438,750
Pedestrian Bridge	6,000	$ 15.00	$ 90,000
Subtotal			**$ 1,497,500**
Section II (M-10 Interchange)			
	Deck Area (sq.ft.)	Unit Cost	Cost
Warren	25,350	$ 25.00	$ 633,750
Pedestrian Bridge	7,500	$ 15.00	$ 112,500
West to South	48,400	$ 25.00	$ 1,210,000
South	13,500	$ 25.00	$ 337,500
South	16,050	$ 25.00	$ 401,250
North	16,000	$ 25.00	$ 400,000
North	11,600	$ 25.00	$ 290,000
East to North	44,850	$ 25.00	$ 1,121,250
East	10,400	$ 25.00	$ 260,000
West	20,500	$ 25.00	$ 512,500
3rd Ave	30,400	$ 25.00	$ 760,000
Subtotal			**$ 6,038,750**
Section III (M-10 to I-75)			
	Deck Area (sq.ft.)	Unit Cost	Cost
2nd St.	17,800	$ 25.00	$ 445,000
Cass	16,500	$ 25.00	$ 412,500
Woodward	13,500	$ 25.00	$ 337,500
John R.	13,400	$ 25.00	$ 335,000
Brush	12,700	$ 25.00	$ 317,500
Beaubien	11,900	$ 25.00	$ 297,500
Subtotal			**$ 2,145,000**

Section IV (I-75 Interchange)			
	Deck Area (sq.ft.)	Unit Cost	Cost
East	5,250	$ 25.00	$ 131,250
West	7,550	$ 25.00	$ 188,750
West to South	28,750	$ 25.00	$ 718,750
East to North	11,100	$ 25.00	$ 277,500
North to West	23,900	$ 25.00	$ 597,500
I-75	34,900	$ 25.00	$ 872,500
South to East	17,400	$ 25.00	$ 435,000
Subtotal			**$ 3,221,250**
Section V (I-75 to E.O.P.)			
	Deck Area (sq.ft.)	Unit Cost	Cost
Chene	12,000	$ 25.00	$ 300,000
E. Grande	22,900	$ 25.00	$ 572,500
Lucky	7,850	$ 25.00	$ 196,250
Mt. Elliott	31,150	$ 25.00	$ 778,750
Conrail R.R.	8,250	$ 45.00	$ 371,250
Concord	12,400	$ 25.00	$ 310,000
Pedestrian Bridge	2,800	$ 15.00	$ 42,000
Frontenac	10,950	$ 25.00	$ 273,750
Pedestrian Bridge	3,700	$ 15.00	$ 55,500
Van Dyke	19,400	$ 25.00	$ 485,000
Pedestrian Bridge	3,300	$ 15.00	$ 49,500
Burns	10,900	$ 25.00	$ 272,500
Pedestrian Bridge	2,900	$ 15.00	$ 43,500
McClellan	14,950	$ 25.00	$ 373,750
Gratiot	32,800	$ 25.00	$ 820,000
Cadillac	14,100	$ 25.00	$ 352,500
French	12,800	$ 25.00	$ 320,000
Pedestrian Bridge	3,200	$ 15.00	$ 48,000
Conrail R.R.	15,000	$ 45.00	$ 675,000
Conner Ave.	25,350	$ 25.00	$ 633,750
Subtotal			**$ 6,973,500**
Bridge Demolition Total			**$ 19,876,000**

Removal of Structures
Item 10

Location	Skip Qty. (ft.) x 3	Solid Qty. (ft.) x 3
Mainline	823,680	411,840
Frontage Roads	205,920	411,840
M-10	126,720	126,720
M-10 Frontage Roads	126,720	126,720
I-75 Frontage Roads	126,720	126,720
Mt Elliott	12,600	12,600
Gratiot	19,950	8,550
Conner	46,800	23,400
Cross Streets (minor)	54,000	81,000
Total (ft.)	**1,543,110.00**	**1,329,390.00**
Cost	$0.07	$0.07
Total Cost	**$108,017.70**	**$93,057.30**
Lump Sum Costs		**$201,075.00**
Arrows and Markings		**$40,215.00**
Total		**$241,290.00**

Striping Quantities
Item 14

36" RCP			
	Length	**Unit Cost**	**Cost**
WB Frontage	34,730	$75.00	$2,604,750.00
EB Frontage	33,645	$75.00	$2,523,375.00
M-10 SB Frontage	7,600	$75.00	$570,000.00
M-10 NB Frontage	7,600	$75.00	$570,000.00
Subtotal			**$6,268,125.00**
60" RCP			
	Length	**Unit Cost**	**Cost**
WB Mainline	36,170	$145.00	$5,244,650.00
EB Mainline	35,640	$145.00	$5,167,800.00
M-10 SB	7,600	$145.00	$1,102,000.00
M-10 NB	7,600	$145.00	$1,102,000.00
Subtotal			**$12,616,450.00**
Drop Inlets (every 300' on ML & M-10; every 400' on service roads)			
	Quantity	**Unit Cost**	**Cost**
WB Frontage	88	$4,200.00	$369,600.00
EB Frontage	84	$4,200.00	$352,800.00
WB Mainline	242	$4,200.00	$1,016,400.00
EB Mainline	238	$4,200.00	$999,600.00
M-10 SB	52	$4,200.00	$218,400.00
M-10 NB	52	$4,200.00	$218,400.00
M-10 SB Frontage	19	$4,200.00	$79,800.00
M-10 NB Frontage	19	$4,200.00	$79,800.00
Subtotal			**$3,334,800.00**
Pump Stations	6	$200,000.00	**$12,000,000.00**
Total			**$34,219,375.00**

Section 1 =	$1,476,000.00
Section 2 =	$2,076,000.00
Section 3 =	$1,632,000.00
Section 4 =	$0.00
Section 5 =	$6,816,000.00

Drainage Quantities
Item 16

Appendix C
Detailed Cost Estimate of DEIS Build Alternative

Appendix C
Detailed Cost Estimate of DEIS Build Alternative

Assume a 14' outside shldr, 4-12' lanes, 12' inside shldr, and a 3' median for one side of the mainline.

	Unit	Unit Cost	Quantity/ft. of Freeway	Cost/ft. of Freeway
Earth Excavation 3'	cu yd	$5.00	17.11	$85.56
Sub Base 12"	cu yd	$12.50	5.70	$71.30
Aggregate Base 4"	sq yd	$4.50	5.65	$25.41
Pavement and Shoulder (PCC)	sq yd	$35.00	17.11	$598.89
Pavement Marking	ft	$0.25	10.00	$2.50
Removal of Surface	sq yd	$4.50	13.33	$60.00
Lighting	lsum	$145.69	1.00	$145.69
Single Face Barrier	ft	$75.00	2.00	$150.00
Double Face Barrier	ft	$68.00	1.00	$68.00
Drainage	lsum	$990.68	1.00	$990.68
Signing	lsum	$378.79	1.00	$378.79
Sidewalk	sq ft	$4.00	0	$0.00
Landscaping	lsum	$233.10	1	$233.10
Sub Total				$2,809.90

Traffic Control (15% of subtotal)	$421.49
Miscelleneous (15% of subtotal)	$421.49

Total/ft. of Mainline	$3,653

Total/mile	$19,287,200

Typical Section: Mainline

Assume a 8' outside shldr, 2-2' gutters, and 1-11' lanes.

	Unit	Unit Cost	Quantity/ft. of Service Drive	Cost/ft. of Service Drive
Earth Excavation 1'	cu yd	$5.00	1.26	$6.30
Sub Base 12"	cu yd	$12.50	1.11	$13.89
Aggregate Base 4"	sq yd	$4.50	1.10	$4.95
Pavement and Shldr (Asphalt)	sq yd	$12.00	1.67	$20.00
Pavement Marking	ft	$0.25	2.00	$0.50
Removal of Surface	sq yd	$1.70	3.33	$5.67
Lighting	lsum	$72.84	1.00	$72.84
Single Face Barrier	ft	$75.00	0.00	$0.00
Double Face Barrier	ft	$68.00	0.00	$0.00
Drainage	lsum	$100.00	1.00	$100.00
Signing	lsum	$50.00	1.00	$50.00
Sidewalk	sq ft	$4.00	5	$20.00
Landscaping	lsum	$116.55	0	$0.00
Sub Total				**$294.15**

Traffic Control (15% of subtotal)	**$44.12**
Miscelleneous (15% of subtotal)	**$44.12**

Total/ft. of Mainline	**$382**

Total/mile	**$2,019,000**

Typical Section: Two-Lane Service Drive

Assume a 8' outside shldr, 2-2' gutters, and 1-11' lanes.

	Unit	Unit Cost	Quantity/ft. of Service Drive	Cost/ft. of Service Drive
Earth Excavation 1'	cu yd	$5.00	0.81	$4.07
Sub Base 12"	cu yd	$12.50	0.67	$8.33
Aggregate Base 4"	sq yd	$4.50	0.66	$2.97
Pavement and Shoulder (Asphalt)	sq yd	$12.00	1.00	$12.00
Pavement Marking	ft	$0.25	2.00	$0.50
Removal of Surface	sq yd	$1.70	3.33	$5.67
Lighting	lsum	$72.84	1.00	$72.84
Single Face Barrier	ft	$75.00	0.00	$0.00
Double Face Barrier	ft	$68.00	0.00	$0.00
Drainage	lsum	$100.00	1.00	$100.00
Signing	lsum	$50.00	1.00	$50.00
Sidewalk	sq ft	$4.00	5	$20.00
Landscaping	lsum	$116.55	0	$0.00
Sub Total				$276.39

Traffic Control (15% of subtotal)	$41.46
Miscelleneous (15% of subtotal)	$41.46

Total/ft. of Mainline	$359

Total/mile	$1,897,100

Typical Section: One-Lane Service Drive

8.3 Cost Model

Introduction

The cost estimate for the proposed I-94 reconstruction and widening is shown below. The cost estimate is presented in conformance with ASTM Standard Classification for Allocated Sums in Construction. In conventional estimating, a percentage of the estimated construction cost will be added as a contingency to compensate for design and construction unknowns (changes and risks) at the concept phase, such as utilities and right-of-way. ASTM has developed a process in which these contingencies are divided into three parts; allowance, contingency and reserve. In this way, the intent of each are explained and the purpose of cost allocation will be well defined.

The costs corresponding to the four cost categories described below are combined to form three successive levels of cost totals: minimum, expected and maximum cost estimates.

VE Cost Summary

Base Cost	$334,934,000	
Allowance	$308,344,000	
Total Minimum Construction Cost (2001)		**$643,278,000**
Total Minimum Construction Cost (2002)		**$675,442,000**
Total Minimum Construction Cost (2004)		**$744,675,000**
Contingency	$132,219,000	
Total Expected Construction Cost (2001)		**$775,497,000**
Total Expected Construction Cost (2002)		**$814,272,000**
Total Expected Construction Cost (2004)		**$897,735,000**
Reserve	$203,593,000	
Total Max. Construction Cost (2001)		**$979,090,000**
Total Max. Construction Cost (2002)		**$1,028,045,000**
Total Max. Construction Cost (2004)		**$1,133,420,000**

Minimum Construction Cost

The minimum construction cost is an estimate of all construction work that will be the basis to forecast a reasonable construction cost. It includes base costs and certain allowance costs.

Base Cost

Base costs are developed from easily quantifiable, well-known, and reliable quantities and unit costs. The base costs are the known costs of the project. It is a sum of money intended to be spent. For example, the $14.2 million cost to retrofit the Dequindre Bridge to accommodate the proposed mainline cross section is a base cost. The base cost for the cost model is the DEIS estimate from Exhibit 4.1 with two revisions; reduced costs for "Drainage" and "Pump Stations" as defined in the drainage section.

Allowance

The allowance ensures a full and complete estimate.

The allowance is a sum of money intended to be spent. However, unlike base costs, allowances are used in the absence of precise knowledge, and estimated to ensure a full and complete estimate. Allowances cover events and activities that are normally internal and so are directly controllable within the project plan. There are two types of allowance costs, specific and nonspecific. Where the content of the sum is uniquely identified and the sum is calculated solely for that purpose, it is specific. When the content of the sum is broadly identified and the sum is calculated for general purpose, it is nonspecific. For example, $35.6 million has been included in the allowance to account for the difference in the DEIS total bridge cost and VE estimate for bridges.

Base Cost

Item	Unit	Unit Cost	Quantity	Total
Asphalt Pavement (6/12 Section)	sq yd	$11.70	333,170	$3,898,000
Concrete Pavement (12/12 Section)	sq yd	$90.00	770,093	$69,308,000
3" Mill and Overlay	sq yd	$9.00	68,442	$616,000
Removal of Surfacing	sq yd	$1.70	1,247,543	$2,121,000
Curb and Gutter	ft	$7.65	206,080	$1,577,000
Sidewalk	sq ft	$2.50	530,714	$1,327,000
Concrete Median Pavement	sq ft	$3.40	129,700	$441,000
Bridges	sq ft	N/A	N/A	$141,023,000
Retaining Walls	sq ft	$60.00	343,114	$20,587,000
Removal of Structures	lsum	$19,876,000.00	1	$19,876,000
Signals	per inters.	$100,000.00	52	$5,200,000
Lighting	lsum	$10,000,000.00	1	$10,000,000
Signing	lsum	$13,000,000.00	1	$13,000,000
Striping	lsum	$241,000.00	1	$241,000
RR Crossing	per xing	$100,000.00	4	$400,000
Drainage	lsum	$15,819,000.00	1	$15,819,000
Pump Stations	ea	$2,000,000.00	4	$8,000,000
Concrete Wall Barrier	ft	$90.00	150,000	$13,500,000
Landscaping	lsum	$8,000,000.00	1	$8,000,000
Total Base Cost				**$334,934,000**

Allowance

Specific Allowances	
Utility Relocation	$10,690,000
Traffic Control	$19,170,000
Drainage	$3,000,000
Bridges	$35,561,000
Removal of Structures	$3,908,000
Retaining Walls	$21,038,000
Pavement	$26,208,000
Enhancement	$13,397,000
ROW	$35,000,000
Mobilization	$23,395,000
Engineering Fee	$116,977,000
Non-Specific Allowances	
Total Allowance	**$308,344,000**

Base Cost		**$334,934,000**
Allowance	**+**	**$308,344,000**
Total Minimum Construction Cost (2001)	**=**	**$643,278,000**
Total Minimum Construction Cost (2002)	=	**$675,442,000**
Total Minimum Construction Cost (2004)	**=**	**$744,675,000**

Appendix D
Value Engineering Cost Model (May 2004)

Expected Construction Cost

The expected construction estimate includes the total minimum construction estimate plus both specific and nonspecific contingency costs.

Contingency

The contingency is a sum of money not intended to be spent. It is used in the absence of precise knowledge, and estimated to ensure that a financial buffer is available within a budget. This buffer is intended to assist in mitigating the effects of unplanned events and other risks that are normally external to the project plan and so are not directly controllable. For example, the $16.5 million additional cost to widen the Dequindre Bridge shoulder from the proposed four feet to the recommended 14 ft. is included in the contingency.

Maximum Construction Cost

The maximum construction estimate includes the expected construction estimate plus both specific and nonspecific reserve costs.

Reserve

The reserve is a sum of money usually held by the management (client) and not normally intended to be spent. It is used to provide insurance against a project or program failing to complete on budget or for the revision of a budget in the case of changed management or program direction and requirement. For example, the $11.2 million additional cost to replace the Dequindre Bridge superstructure in order to eliminate constraints imposed by the existing bridge alignment, profile, and superelevation is included as a reserve cost.

Contingency

Specific Contingencies	
Utility Relocation	$10,690,000
Traffic Control	$10,790,000
Drainage	$7,400,000
Bridges	$16,500,000
Removal of Structures	$0
Retaining Walls	$27,750,000
Pavement	$11,072,000
Enhancement	$0
ROW	$15,000,000
Mobilization	$930,000
Engineering Fee	$23,258,000
Non-Specific Contingencies	
Bridges	$8,829,000
Total Contingency	**$132,219,000**

Total Minimum Construction Cost		**$643,278,000**
Contingency	**+**	**$132,219,000**
Total Expected Construction Cost (2001)	**=**	**$775,497,000**
Total Expected Construction Cost (2002)	=	**$814,272,000**
Total Expected Construction Cost (2004)	**=**	**$897,735,000**

Reserve

Specific Reserve	
Utility Relocation	$0
Traffic Control	$50,000,000
Drainage	$40,600,000
Bridges	$28,893,000
Removal of Structures	$1,037,000
Retaining Walls	$23,125,000
Pavement	$3,691,000
Enhancement	$6,699,000
ROW	$0
Mobilization	$0
Engineering Fee	$40,719,000
Non-Specific Reserve	
Bridges	$8,829,000
Total Reserve	**$203,593,000**

Expected Cosnstruction Cost		**$775,497,000**
Reserves	**+**	**$203,593,000**
Total Maximum Construction Cost (2001)	**=**	**$979,090,000**
Total Maximum Construction Cost (2002)	**=**	**$1,028,045,000**
Total Maximum Construction Cost (2004)	**=**	**$1,133,420,000**

The following provides detail for costs associated with each element under Allowance, Contingency and Reserve. The base cost for each element is taken from the DEIS estimate except as noted under drainage.

Utility Relocation

Allowance:

- Allowance for utility relocation for mainline roadway is assumed to be 4% of base costs attributable to mainline roadway.
- Allowance for utility relocation for service drives is assumed to be 5% of base costs attributable to service drives.
- Allowance for utility relocation for bridges is estimated to be 2% of base costs attributable to bridges.

Contingency:

- Contingency is 100% of the total utility allowance.

Reserve:

- Reserve is 0% of the total utility allowance.

Allowance

	Base Cost 2001		Utilities Relocation		Element	Percentage
Interchange M-10		$75.73		$2.15	Mainline Roadway	4%
Bridges	$44.04		$0.88		Service Roads	5%
Roadway	$31.70		$1.27		Bridges	2%
Interchange I-75		$72.80		$1.73		
Bridges	$58.97		$1.18			
Roadway	$13.83		$0.55			
Interchange Gratiot		$3.45		$0.14		
Interchange Conner		$3.39		$0.14		
Mainline		$96.09		$3.84		
I-96 to M-10	$17.89		$0.72			
M-10 to I-75	$19.98		$0.80			
I-75 to Conner	$58.22		$2.33			
Service Roads		$33.98		$1.70		
I-96 to M-10	$8.15		$0.41			
M-10 to I-75	$6.93		$0.35			
I-75 to Gratiot	$1.26		$0.06			
Gratiot to Conner	$17.64		$0.88			
Bridges		$49.46		$0.99		
I-96 to M-10	$6.63		$0.13			
M-10 to I-75	$12.36		$0.25			
I-75 to Conner	$30.47		$0.61			
	2001 Total	**$334.90**	**Allowance**	**$10.69**		
Contingency						
					Element	**Allowance**
Contingency Total				**$10.69**	Utilities	100%
Reserve						
					Element	**Allowance**
Reserve Total				**$0.00**	Utilities	0%
Utilities Total				**$21.37**		

Utility Relocation

Traffic Control

This DEIS cost estimate is based on unknown MOT, construction staging and scheduling schemes. Various options are discussed in "Validation #5 - Construction Staging and Scheduling." The allowance is based on a seven-year construction duration and full closure by segment and includes staging and other construction activities. A higher percentage is used for the mainline construction and a lesser percentage is used for service drive construction.

Allowance:

- Allowance for traffic control for mainline roadway is assumed to be 5% of base costs attributable to mainline roadway.
- Allowance for traffic control for service drives is assumed to be 3% of base costs attributable to service drives.
- Allowance for traffic control for bridges (non-interchange) is assumed to be 5% of base costs attributable to bridges (non-interchange). The bridge percentage is calculated as follows: {$25,000/[(60 ft. x 200 ft.) x $75/sq ft.]} x 100% = 3%, say 5%. [See MDOT Design Manual 3.01.02 maintaining traffic and bridge cost.]
- Allowance for traffic control for interchanges, which includes interchange roadways and bridges, is assumed to be 7% of base costs attributable to interchange bridges and roadway.

Contingency:

- Contingency for traffic control for mainline roadway is assumed to be 2% of base costs attributable to mainline roadway.
- Contingency for traffic control for service drives is assumed to be 1% of base costs attributable to service drives.
- Contingency for traffic control for bridges (non-interchange) is assumed to be 2% of base costs attributable to bridges (non-interchange).
- Contingency for traffic control for interchanges, which includes interchange roadways and bridges, is assumed to be 3% of base costs attributable to interchange bridges and roadway.

Reserve:

- If full closure west of I-75 is desired, construction time will increase from seven to nine years. Thirty percent of allowances for traffic control are reserved for this program change {(.30 x $19,170,000) $5,751,000}. If I-94 traffic is to be maintained, a $50 million reserve should be allocated to cover the cost of the larger of the two ($50 million) is added to the reserve.

Traffic Control

Allowance

	Base Cost 2001		Traffic Control	
Interchange M-10		**$75.73**		**$5.30**
Bridges	$44.04		$3.08	
Roadway	$31.70		$2.22	
Interchange I-75		**$72.80**		**$5.10**
Bridges	$58.97		$4.13	
Roadway	$13.83		$0.97	
Interchange Gratiot		**$3.45**		**$0.24**
Interchange Conner		**$3.39**		**$0.24**
Mainline		**$96.09**		**$4.80**
I-96 to M-10	$17.89		$0.89	
M-10 to I-75	$19.98		$1.00	
I-75 to Conner	$58.22		$2.91	
Service Roads		**$33.98**		**$1.02**
I-96 to M-10	$8.15		$0.24	
M-10 to I-75	$6.93		$0.21	
I-75 to Gratiot	$1.26		$0.04	
Gratiot to Conner	$17.64		$0.53	
Bridges		**$49.46**		**$2.47**
I-96 to M-10	$6.63		$0.33	
M-10 to I-75	$12.36		$0.62	
I-75 to Conner	$30.47		$1.52	

Element	Percentage
Mainline Roadway	5%
Service Roads	3%
Bridges*	5%
Interchanges (Bridges and Roadway)	7%

Base Costs 2001 Total	**$334.90**
Traffic Control Allowance Total	**$19.17**

Contingency

	Base Cost 2001		Traffic Control	
Interchange M-10		**$75.73**		**$2.27**
Bridges	$44.04		$1.32	
Roadway	$31.70		$0.95	
Interchange I-75		**$72.80**		**$2.18**
Bridges	$58.97		$1.77	
Roadway	$13.83		$0.41	
Interchange Gratiot		**$3.45**		**$0.10**
Interchange Conner		**$3.39**		**$0.10**
Mainline		**$96.09**		**$4.80**
I-96 to M-10	$17.89		$0.36	
M-10 to I-75	$19.98		$0.40	
I-75 to Conner	$58.22		$1.16	
Service Roads		**$33.98**		**$0.34**
I-96 to M-10	$8.15		$0.08	
M-10 to I-75	$6.93		$0.07	
I-75 to Gratiot	$1.26		$0.01	
Gratiot to Conner	$17.64		$0.18	
Bridges		**$49.46**		**$0.99**
I-96 to M-10	$6.63		$0.13	
M-10 to I-75	$12.36		$0.25	
I-75 to Conner	$30.47		$0.61	

Element	Percentage
Mainline Roadway	2%
Service Roads	1%
Bridges*	2%
Interchanges (Bridges and Roadway)	3%

Contingency Total	**$10.79**

Reserve

Reserve Total	**$50.00**

Traffic Control Total	**$79.97**

Traffic Control

Drainage

DEIS cost estimate included $22.2 million for drainage and $12 million for pump stations for a total of $34.2 million as shown below.

DRAINAGE QUANTITIES			
36" RCP			
	Length	**Unit Cost**	**Cost**
WB Frontage	34,730	$75.00	$2,604,750.00
EB Frontage	33,645	$75.00	$2,523,375.00
M-10 SB Frontage	7,600	$75.00	$570,000.00
M-10 NB Frontage	7,600	$75.00	$570,000.00
Subtotal			**$6,268,125.00**
60" RCP			
	Length	**Unit Cost**	**Cost**
WB Mainline	36,170	$145.00	$5,244,650.00
EB Mainline	35,640	$145.00	$5,167,800.00
M-10 SB	7,600	$145.00	$1,102,000.00
M-10 NB	7,600	$145.00	$1,102,000.00
Subtotal			**$12,616,450.00**
Drop Inlets (every 300' on ML & M-10; every 400' on service roads)			
	Quantity	**Unit Cost**	**Cost**
WB Frontage	88	$4,200.00	$369,600.00
EB Frontage	84	$4,200.00	$352,800.00
WB Mainline	242	$4,200.00	$1,016,400.00
EB Mainline	238	$4,200.00	$999,600.00
M-10 SB	52	$4,200.00	$218,400.00
M-10 NB	52	$4,200.00	$218,400.00
M-10 SB Frontage	19	$4,200.00	$79,800.00
M-10 NB Frontage	19	$4,200.00	$79,800.00
Subtotal			**$3,334,800.00**
Pump Stations	6	$200,000.00	**$12,000,000.00**
Total			**$34,219,375.00**

Drainage Cost (DEIS)

The base cost for drainage and pump stations reflects the combination of VE options 1 and 2 as described in Validation 4.

The base cost reflects the estimated savings of $10.4 million (drainage - $6.2 million and pump station - $4.2 million); therefore the base cost has been reduced to $23.8 million.

Allowance:
The base cost does not include a pump station at the I-94/ I-96 interchange. Three million dollars has been included in the allowance to cover the cost if further detailed design requires the pump station.

- Allowance is $3,000,000

Contingency:
The contingency provide for construction of the drainage system provided in the DEIS in the event this is required for phased construction.

- Contingency is $7,400,000

Reserve:
VE Option 3 provided for the construction of a separate storm water system independent of the combined city system.

- Reserve is $40,600,000

Bridges

Prior to the cost model analysis, the VE team reviewed the DEIS cost estimate for bridges and removal of structures. It did not correlate with the Recommended Alternative exhibits. The VE team developed the tables 8.1 and 8.2 based on the Recommended Alternative exhibits. Structure numbers, where applicable, were provided by MDOT and have been added to the table.

Allowance:
- The allowance accounts for the difference between the DEIS cost estimate and the validated study cost estimate, except for the two GTW/Conrail bridges that are included in the reserve. This validation detail is shown Table 8.1. The difference in cost between DEIS and VE estimate is $35,561,000, which includes $4 million for the bridges required for the work on M-10 not included in the DEIS estimate.

Contingency:
- Nonspecific contingency is assumed to be 5% of the sum of the bridge base cost plus bridge allowance. This will cover the walled-in area of bridges due to potential changes in profile, geometry, and construction staging of bridges.

- DEIS cost estimate for Dequindre bridge widening is $14.2 million. If the widening is not feasible and 14 ft. median is desired, cost of this improvement should be added to the contingency ($30,700,000 - $14,200,000) $16,500,000.

Nonspecific Contingency
.05($141,023,000 + $35,561,000) = $8,829,000
Specific Contingency
Dequindre Widening $16,500,000
$25,329,000

Reserve:
- Nonspecific reserve is assumed to be 5% of the sum of the bridge base cost plus bridge allowance.
- The first specific reserve is $17,693,000 for the two GTW/Conrail bridges not included in the DEIS cost estimate.
- The second specific reserve is for the additional cost if the Dequindre bridge, Option 6 as outlined in Validation 3a, is adopted ($41,900,000 - $30,700,000) $11,200,000.

Nonspecific Reserve
.05($141,023,000 + $35,561,000) = $8,829,000
Specific Reserve
GTW/Conrail bridges $17,693,000
Dequindre Widening $11,200,000
$37,722,000

Removal of Structures

Allowance:
- Accounts for the difference between the DEIS quantity estimate and the VE Study cost estimate, except for the two GTW/Conrail bridges included in the reserve. The increase does account for $0.5 million for work on M-10 not included in the DEIS estimate. The validation detail is shown in Table 8.2.
- Allowance is calculated as $3,908,000.

Contingency:
- Contingency is assumed to be $0.

Reserve:
- Reserve is calculated as $1,037,000 to account for the two GTW/Conrail bridges not accounted for in the draft EIS cost estimate.

	Bridge Cost Validation		Construction Length	Width	Area	Unit Cost	Total
	Grand River	S17 of 82023	240	119	28560	$ 80.00	$ 2,284,800.00
	Linwood	S18 of 82023	190	68	12920	$ 80.00	$ 1,033,600.00
	14th Street	S19 of 82023	215	64	13760	$ 80.00	$ 1,100,800.00
	GT Western Conrail (E) over Wabash*	NOT NUMBERED	80	40	5600	$ 465.00	$ 2,604,000.00
	Rosa Parks	S20 of 82023	235	56	13160	$ 80.00	$ 1,052,800.00
	Trumbull	S21 of 82023	270	94	25380	$ 80.00	$ 2,030,400.00
	GTW/Conrail Bridge (N) over M-10	X01 of 82112	350	24	8400	$ 465.00	$ 3,906,000.00
	GTW/Conrail Bridge (S) over M-10	X01 of 82112	360	40	14400	$ 465.00	$ 6,696,000.00
	Holden Ped Bridge	P01 of 82112			11200	$ 80.00	$ 896,000.00
	Brooklyn St. Ped Bridge	P05 of 82023			0	-	-
M-10 Interchange	I-94 WB to M-10 SB (West to South)	S26 of 82023			0	-	-
	M-10 SB over M-10 NB to I-94 WB	S22 of 82023			0	-	-
	M-10 NB (Mainline)	S27 of 82023			0	-	-
	M-10 SB (Mainline)	S24 of 82023			0	-	-
	M-10 NB over I-94 WB to M-10 SB	S29 of 82023			0	-	-
	I-94 EB to M-10 NB (East to North)	S25 of 82023			0	-	-
	I-94 EB over I-94 EB to M-10 SB (East)	S23 of 82023			0	-	-
	I-94 WB over M-10 SB to I-94 EB	S28 of 82023			0	-	-
	I-94 EB SD to M-10 SB SD (East to South)				28500	$ 120.00	$ 3,420,000.00
	I-94 EB SD to M-10 NB SD (East to North)				51000	$ 120.00	$ 6,120,000.00
	I-94 WB SD to M-10 SB SD (West to South)				53700	$ 120.00	$ 6,444,000.00
	I-94 WB SD to M-10 NB SD (West to North)				30900	$ 120.00	$ 3,708,000.00
	M-10 NB to I-94 WB (North to West)				34500	$ 120.00	$ 4,140,000.00
	M-10 NB to I-94 EB (North to East)				24000	$ 120.00	$ 2,880,000.00
	M-10 SB to I-94 EB (South to East)				31500	$ 120.00	$ 3,780,000.00
	M-10 SB to I-94 WB (South to West)				19500	$ 120.00	$ 2,340,000.00
	M-10 NB (Mainline)				20400	$ 100.00	$ 2,040,000.00
	M-10 SB (Mainline)				23800	$ 100.00	$ 2,380,000.00
	M-10 NB SD (North Service)				10105	$ 180.00	$ 1,818,900.00
	M-10 SB SD (South Service)				10200	$ 180.00	$ 1,836,000.00
	Merrick Ave Ped Brridge	P07 of 82111			13400	$ 80.00	$ 1,072,000.00
	Warren Ave Bridge	S19 of 82111	160	124	19840	$ 80.00	$ 1,587,200.00
	Forest Ave Bridge	S18 of 82111	150	114	17100	$ 80.00	$ 1,368,000.00
	Canfield Ave Ped Bridge	P06 of 82111			0	-	-
	U-Turn Bridge (south on M-10) ?? Not in scope				0	-	-
	Third Ave.	S30 of 82023			0	-	-
	Second Ave.	S01 of 82024	270	89	24030	$ 80.00	$ 1,922,400.00
	Cass	S02 of 82024	205	66	13530	$ 80.00	$ 1,082,400.00
	Woodward	S03 of 82024	220	114	25080	$ 80.00	$ 2,006,400.00
	John R	S04 of 82024			0	-	-
	Brush	S05 of 82024	255	78	19890	$ 80.00	$ 1,591,200.00
	Beaubien	S06 of 82024			0	-	-
	Milwaukee St. over I-75	S02 of 82252	240	64	15360	$ 80.00	$ 1,228,800.00
	Abandoned RR Bridge	NOT NUMBERED			0	-	-
	Abandoned RR Bridge	NOT NUMBERED			0	-	-
	Piquette St. over I-75	S01 of 82252			0	-	-
	Ferry St. over I-75	S20 of 82251			0	-	-
	I75/I94	S27 of 82251			0	-	-
	I-75 SB to I-94 WB	S28 of 82251			0	-	-
I-75 Interchange	I-94 WB to I-75 SB over I-94	S24 of 82251			0	-	-
	I-75 SB to I-94 EB over I-75 and I-94	S30 of 82251			0	-	-
	94 W to 75S (West to South) over I-75	S29 of 82251			0	-	-
	94E to 75N (East to North)	S26 of 82251			0	-	-
	NBD I-75 to WBD I-94	S25 of 82251			0	-	-
	I-94 eB Ent ramp	S21 of 82251			0	-	-
	I-94 EB to I-75 NB over I-75	S23 of 82251			0	-	-
	I-94 WB to I-75 SB over I-94E to I75 N	S22 of 82251			0	-	-
	94E to 75N (East to North)				71036	$120.00	$ 8,524,320.00
	75 to 94W (N.&S. to West)				47019	$120.00	$ 5,642,280.00
	94W to 75S (West to South)				81989	$120.00	$ 9,838,680.00
	75 to 94E (N.&S. to East)				48443	$120.00	$ 5,813,160.00
	75S to 94 (South)				12476	$200.00	$ 2,495,200.00
	75N to 94 (North)				18281	$200.00	$ 3,656,200.00
	94 over 75 (I-94)				48839	$100.00	$ 4,883,900.00
	W Service over 75 (West Service)				8533	$100.00	$ 853,300.00
	E Service over 75 (East Service)				13512	$100.00	$ 1,351,200.00
	1 Service over 94Eto75S (East Service)				2478	$180.00	$ 446,040.00
	2 Service over 94Eto75S (South Service)				3528	$180.00	$ 635,040.00
	Service over 94Wto75N (North)				5011	$180.00	$ 901,980.00
	Widen/Rebuild Dequindre (I-94)				102762	$150.00	$ 15,414,300.00
	Misc I-75 Bridge Costs						$ 4,215,000.00
	Chene ramp to I-94	S17 of 82024			0	-	-
	Chene	S08 of 82024	190	78	14820	$ 80.00	$ 1,185,600.00
	E. Grand	S09 of 82024	200	94	18800	$ 80.00	$ 1,504,000.00
	Lucky Place	S18 of 82024			0	-	-
	Saginaw U Turn	S19 of 82024			0	-	-
	M. Elliott	S10 of 82024	190	204	38760	$ 80.00	$ 3,100,800.00
	Harper EB	S16 of 82024			0	-	-
	Conrail RR	X02 of 82024	310	50	15500	$ 465.00	$ 7,207,500.00
	Concord	S11 of 82024	200	49	9800	$ 80.00	$ 784,000.00
	Helen Ped	P04 of 82024			8880	$ 80.00	$ 710,400.00
	Frontenac	S12 of 82024	200	54	10800	$ 80.00	$ 864,000.00
	Townsend Ped	P05 of 82024			9120	$ 80.00	$ 729,600.00
	Van Dyke	S13 of 82024	185	92	17020	$ 80.00	$ 1,361,600.00
	Iroquois Ped	P06 of 82024			11800	$ 80.00	$ 944,000.00
	Burns	S14 of 82024	200	54	10800	$ 80.00	$ 864,000.00
	Rohns Ped	P07of 82024			11400	$ 80.00	$ 912,000.00
	McClellan	S 15 of 82025			0	-	-
	Gratiot	S01 of 82025	240	168	40320	$ 80.00	$ 3,225,600.00
	Cadillac	S02 of 82025	200	56	11200	$ 80.00	$ 896,000.00
	French	S03 of 82025	190	54	10260	$ 80.00	$ 820,800.00
	Springfield Ped	P02 of 82025			9120	$ 80.00	$ 729,600.00
	Conrail RR	X01 of 82025	335	55	18425	$ 465.00	$ 8,567,625.00
	Conrail RR (Spur)	X01 of 82025					
	Conner		150	173	25950	$ 80.00	$ 2,076,000.00
	West Conner	S04 of 82025					
	East Conner	S05 of 82025					
	Malcolm Ped	P03 of 82025			5160	$ 80.00	$ 412,800.00
	Barrett	S06 of 82025	150	54	8100	$ 80.00	$ 648,000.00

Totals (As Proposed) **$ 176,584,225.00**

Totals (As Designed) **$ 141,022,850.00**

Difference **$ 35,561,375.00**

GT Western Conrail (W) over I-94*	X02 of 82023	450	35	17250	$ 465.00	$ 8,021,250.00
GT Western Conrail (E) over I-94*	X02 of 82023	460	40	20800	$ 465.00	$ 9,672,000.00

* Includes Cost of Railroad bridges removed and replaced over Kirby

$ 17,693,250.00

Assumptions
Removal Costs: Widths taken from aerial, lengths taken from Report 44 (Bridge Inventory Report)
Construction Costs: Widths taken from aerial, add 7' to each side for sidewalk in areas it applies.
Length of bridges taken from aerial and added 10' from edge of metal to face of full height abutment.

Bridge Costs(per square foot):
Construction

Pedestrian bridge	$80.00 /SF
Local street bridges	$80.00 /SF
Mainline over mainline bridges	$100.00 /SF
Directional ramp bridges	$120.00 /SF
Dequindre widening	$150.00 /SF
Service drive bridges	$180.00 /SF
Braided ramp bridges**	$200.00 /SF
Railroad bridges	$465.00 /SF

Table 8.1
Bridge Construction Cost
VE Estimate

Appendix D
Value Engineering Cost Model
(May 2004)

Appendix D
Value Engineering Cost Model
(May 2004)

	Bridge Cost Validation		Removal Length	Width	Area	Unit Cost	Total
	Grand River	S17 of 82023	251	100	25100	$ 25.00	$ 627,500.00
	Linwood	S18 of 82023	173	62	10726	$ 25.00	$ 268,150.00
	14th Street	S19 of 82023	166	80	13280	$ 25.00	$ 332,000.00
	GT Western Conrail (E) over Wabash*	NOT NUMBERED	80	40	5600	$ 45.00	$ 252,000.00
	Rosa Parks	S20 of 82023	120	50	6000	$ 25.00	$ 150,000.00
	Trumbull	S21 of 82023	210	88	18480	$ 25.00	$ 462,000.00
	GTW/Conrail Bridge (N) over M-10	X01 of 82112	155	24	3720	$ 45.00	$ 167,400.00
	GTW/Conrail Bridge (S) over M-10	X01 of 82112	142	40	5680	$ 45.00	$ 255,600.00
	Holden Ped Bridge	P01 of 82112	289	12	3468	$ 15.00	$ 52,020.00
	Brooklyn St. Ped Bridge	P05 of 82023	347	12	4164	$ 15.00	$ 62,460.00
M-10 Interchange	I-94 WB to M-10 SB (West to South)	S26 of 82023	1158	45	52110	$ 25.00	$ 1,302,750.00
	M-10 SB over M-10 NB to I-94 WB	S22 of 82023	232	60	13920	$ 25.00	$ 348,000.00
	M-10 NB (Mainline)	S27 of 82023	297	50	14850	$ 25.00	$ 371,250.00
	M-10 SB (Mainline)	S24 of 82023	297	50	14850	$ 25.00	$ 371,250.00
	M-10 NB over I-94 WB to M-10 SB	S29 of 82023	224	55	12320	$ 25.00	$ 308,000.00
	I-94 EB to M-10 NB (East to North)	S25 of 82023	1134	45	51030	$ 25.00	$ 1,275,750.00
	I-94 EB over I-94 EB to M-10 SB (East)	S23 of 82023	186	55	10230	$ 25.00	$ 255,750.00
	I-94 WB over M-10 SB to I-94 EB	S28 of 82023	196	55	10780	$ 25.00	$ 269,500.00
	I-94 EB SD to M-10 SB SD (East to South)						
	I-94 EB SD to M-10 NB SD (East to North)						
	I-94 WB SD to M-10 SB SD (West to South)						
	I-94 WB SD to M-10 NB SD (West to North)						
	M-10 NB to I-94 WB (North to West)						
	M-10 NB to I-94 EB (North to East)						
	M-10 SB to I-94 EB (South to East)						
	M-10 SB to I-94 WB (South to West)						
	M-10 NB (Mainline)						
	M-10 SB (Mainline)						
	M-10 NB SD (North Service)						
	M-10 SB SD (South Service)						
	Merrick Ave Ped Brridge	P07 of 82111	318	14	4452	$ 15.00	$ 66,780.00
	Warren Ave Bridge	S19 of 82111	127	140	17780	$ 25.00	$ 444,500.00
	Forest Ave Bridge	S18 of 82111	111	103	11433	$ 25.00	$ 285,825.00
	Canfield Ave Ped Bridge	P06 of 82111	148	14	2072	$ 15.00	$ 31,080.00
	U-Turn Bridge (south on M-10) ?? Not in scope						
	Third Ave.	S30 of 82023	421	70	29470	$ 25.00	$ 736,750.00
	Second Ave.	S01 of 82024	214	80	17120	$ 25.00	$ 428,000.00
	Cass	S02 of 82024	190	80	15200	$ 25.00	$ 380,000.00
	Woodward	S03 of 82024	237	125	29625	$ 25.00	$ 740,625.00
	John R	S04 of 82024	172	60	10320	$ 25.00	$ 258,000.00
	Brush	S05 of 82024	171	50	8550	$ 25.00	$ 213,750.00
	Beaubien	S06 of 82024	174	60	10440	$ 25.00	$ 261,000.00
	Milwaukee St. over I-75	S02 of 82252	237	65	15405	$ 25.00	$ 385,125.00
	Abandoned RR Bridge	NOT NUMBERED	215	80	17200	$ 45.00	$ 774,000.00
	Abandoned RR Bridge	NOT NUMBERED	215	35	7525	$ 45.00	$ 338,625.00
	Piquette St. over I-75	S01 of 82252	219	120	26280	$ 25.00	$ 657,000.00
	Ferry St. over I-75	S20 of 82251	240	60	14400	$ 25.00	$ 360,000.00
I-75 Interchange	I75/I94	S27 of 82251	188	130	24440	$ 25.00	$ 611,000.00
	I-75 SB to I-94 WB	S28 of 82251	153	45	6885	$ 25.00	$ 172,125.00
	I-94 WB to I-75 SB over I-94	S24 of 82251	309	40	12360	$ 25.00	$ 309,000.00
	I-75 SB to I-94 EB over I-75 and I-94	S30 of 82251	827	34	28118	$ 25.00	$ 702,950.00
	94 W to 75S (West to South) over I-75	S29 of 82251	186	35	6510	$ 25.00	$ 162,750.00
	94E to 75N (East to North)	S26 of 82251	585	35	20475	$ 25.00	$ 511,875.00
	NBD I-75 to WBD I-94	S25 of 82251	772	35	27020	$ 25.00	$ 675,500.00
	I-94 eB Ent ramp	S21 of 82251	172	30	5160	$ 25.00	$ 129,000.00
	I-94 EB to I-75 NB over I-75	S23 of 82251	307	30	9210	$ 25.00	$ 230,250.00
	I-94 WB to I-75 SB over I-94E to I75 N	S22 of 82251	165	45	7425	$ 25.00	$ 185,625.00
	94E to 75N (East to North)						
	75 to 94W (N.&S. to West)						
	94W to 75S (West to South)						
	75 to 94E (N.&S. to East)						
	75S to 94 (South)						
	75N to 94 (North)						
	94 over 75 (I-94)						
	W Service over 75 (West Service)						
	E Service over 75 (East Service)						
	1 Service over 94Eto75S (East Service)						
	2 Service over 94Eto75S (South Service)						
	Service over 94Wto75N (North)						
	Widen/Rebuild Dequindre (I-94)						
	Misc I-75 Bridge Costs						
	Chene ramp to I-94	S17 of 82024	183	30	5490	$ 25.00	$ 137,250.00
	Chene	S08 of 82024	170	65	11050	$ 25.00	$ 276,250.00
	E. Grand	S09 of 82024	186	120	22320	$ 25.00	$ 558,000.00
	Lucky Place	S18 of 82024	174	45	7830	$ 25.00	$ 195,750.00
	Saginaw U Turn	S19 of 82024	161	60	9660	$ 25.00	$ 241,500.00
	M. Elliott	S10 of 82024	169	70	11830	$ 25.00	$ 295,750.00
	Harper EB	S16 of 82024	171	40	6840	$ 25.00	$ 171,000.00
	Conrail RR	X02 of 82024	120	50	6000	$ 45.00	$ 270,000.00
	Concord	S11 of 82024	168	65	10920	$ 25.00	$ 273,000.00
	Helen Ped	P04 of 82024	171	12	2052	$ 15.00	$ 30,780.00
	Frontenac	S12 of 82024	168	60	10080	$ 25.00	$ 252,000.00
	Townsend Ped	P05 of 82024	194	10	1940	$ 15.00	$ 29,100.00
	Van Dyke	S13 of 82024	167	100	16700	$ 25.00	$ 417,500.00
	Iroquois Ped	P06 of 82024	218	10	2180	$ 15.00	$ 32,700.00
	Burns	S14 of 82024	167	65	10855	$ 25.00	$ 271,375.00
	Rohns Ped	P07of 82024	159	12	1908	$ 15.00	$ 28,620.00
	McClellan	S 15 of 82025	224	55	12320	$ 25.00	$ 308,000.00
	Gratiot	S01 of 82025	284	120	34080	$ 25.00	$ 852,000.00
	Cadillac	S02 of 82025	185	70	12950	$ 25.00	$ 323,750.00
	French	S03 of 82025	171	60	10260	$ 25.00	$ 256,500.00
	Springfield Ped	P02 of 82025	197	10	1970	$ 15.00	$ 29,550.00
	Conrail RR	X01 of 82025	127	50	6350	$ 45.00	$ 285,750.00
	Conrail RR (Spur)	X01 of 82025	125	25	3125	$ 45.00	$ 140,625.00
	Conner						$ -
	West Conner	S04 of 82025	220	60	13200	$ 25.00	$ 330,000.00
	East Conner	S05 of 82025	171	60	10260	$ 25.00	$ 256,500.00
	Malcolm Ped	P03 of 82025	217	12	2604	$ 15.00	$ 39,060.00
	Barrett	S06 of 82025	171	70	11970	$ 25.00	$ 299,250.00
	Totals (VE Estimate)						**$ 23,784,075.00**
	Totals (DEIS Estimate)						**$ 19,876,000.00**
	Difference						**$ 3,908,075.00**
	GT Western Conrail (W) over I-94*	X02 of 82023	174	70	13680	$ 45.00	$ 615,600.00
	GT Western Conrail (E) over I-94*	X02 of 82023	174	40	9360	$ 45.00	$ 421,200.00

* Includes Cost of Railroad bridges removed and replaced over Kirby

$ 1,036,800.00

Assumptions
Removal Costs: Widths taken from aerial, lengths taken from Report 44 (Bridge Inventory Report)
Construction Costs: Widths taken from aerial, add 7' to each side for sidewalk in areas it applies.
Length of bridges taken from aerial and added 10' from edge of metal to face of full height abutment.

Bridge Costs(per square foot):

Removal	Pedestrian bridge	$15.00 /SF
	Highway or local street bridge	$25.00 /SF
	Railroad bridge	$45.00 /SF

Table 8.2
Bridge Demolition Cost
VE Estimate

Retaining Walls (Refer to Proposal #1)

Base Cost:
The total cost of the retaining walls, as shown on DEIS estimate, is $20,587,000 (Appendix A, Item #9). The cost is based on 40,969 linear feet with an average height of 8.38 ft. and using a unit price of $60.00/sf.

Allowance:
The VE team, based on the use of aerials and contour mapping estimated the total length of the wall to be 40,250 linear feet and an average height of 15 ft. Utilizing the same unit price of $60.00/sf. the total cost of the wall will be $41,625,000. In the absence of exact quantities the difference ($41,625,000 - $20,587,000) $21,038,000 is added to the allowance, which includes $10.2 million for reconstruction of 4,300 lf. of M-10 south of the M-10/I-94 interchange.

Contingency:
- Accounts for the difference between a VE study cost estimate that assumes a 15-ft.-high wall with a unit cost of $60/sft. and a VE study cost estimate that assumes a 15-ft.-high wall with a unit cost of $100/sft. The VE team assumes that $100/sft. is an appropriate cost estimate for a 15-ft.-high wall.

- Contingency is calculated as ($69,375,000 - $41,625,000) $27,750,000.

Reserve:
- Accounts for the difference between a VE study cost estimate that assumes a 15-ft.-high wall with a unit cost of $100/sft. and a VE study cost estimate that assumes a 20-ft.-high wall with a unit cost of $100/sft. A 20-ft.-high wall represents an increased wall height that would result if sloped mainline embankment proposed in the DEIS is replaced with retaining walls.

- Reserve is calculated as ($92,500,000 - $69,375,000) $23,125,000.

Pavement

Pavement includes; asphalt pavement, concrete pavement and three inch mill and overlay.

Allowance:
- Accounts for the difference between the DEIS and the validated study cost estimate. The validation detail for mainline and ramps follows. Using the same unit price of $90/sy. the difference between the DEIS and the VE estimate is $1,826,000 as shown on Exhibit 8.3. An additional $17.0 million has been added for concrete pavement for the reconstruction of 4,300 lf. of M-10/I-94 interchange not included in the DEIS estimate.

- An additional allowance is assumed to be 10% of the total base pavement cost. This accounts for all miscellaneous pavement-related cost elements, i.e., underdrains, joints, slope restoration, and the $0.3 million difference between the DEIS and VE estimate for ashpalt pavement on crossroads and service drives as shown on Exhibit 8.4.

0.1($3,900,000+$69,300,000+$616,000) = $7,382,000

Difference in Quantity =	$ 1,826,000
M-10 Pavement	$17,000,000
Miscellaneous Related Items	$ 7,382,000
	$26,208,000

Contingency:
- Accounts for unknown field conditions and staging requirements. This includes subgrade and earthwork costs, temporary roadway, and temporary sheeting.

- Contingency is assumed to be 15% of the total base pavement cost.
0.15($3,900,000+$69,300,000+$616,000)= $11,072,000

Reserve:
- Accounts for changes in the pavement concept, i.e., a change in the proposed typical sections, additional lanes or extended limits on crossroads.

- Reserve is assumed to be 5% of the total base pavement cost.
0.05($3,900,000+$69,300,000+$616,000)= $3,691,000

Appendix D
Value Engineering Cost Model
(May 2004)

CONCRETE PAVEMENT (12/12 SECTION)
Areas taken from polygons on level 49 of the Mod 1 drawings
Areas include median and all shoulders
Ramps included in polygons along I-94 from POB to I-75 only

I-94 mainline	Quant.	Unit
POB to 2nd St	1,442,632	SF
2nd St to I-75	893,795	SF
I-75 to St. Aubin	2,263,936	SF
St Aubin to Gratiot	710,155	SF
Graiot to POE	310,076	SF
M-10		
POE to I-94	533,808	SF
I-94 to POB	491,226	SF
I-75 & M-10 Inerchange		
SB I-75 off ramp	23,425	SF
SB I-75 to I-94 EB & WB	26,622	SF
EB I-94 to SB I-75	69,302	SF
WB I-94 to I-75 SB	44,973	SF
NB I-75 off ramp	38,713	SF
NB I-75 to I-94 EB & WB	23,428	SF
SB I-75 to SB CD road	13,037	SF
WB I-94 to I-75 NB	24,167	SF
EB I-94 to NB I-75	21,465	SF
Subtotal	6,930,760	SF
Total (VE Estimate)	**7,113,420**	**SF**
Total (DEIS Estimate)	**6,930,841**	**SF**
VE Cost Estimate	**790380**	**@$90/SY=**
DEIS Cost Estimate	**770093**	**@$90/SY=**
Difference =		

Ramps I-75 to POE

Location	Quant.	Unit
I-94 WB to Conner	19,803	SF
Conner to I-94 WB	10,036	SF
I-94 WB to Gratiot	7,418	SF
Gratiot to I-94 WB	7,831	SF
I-94 WB to Van Dyke	10,073	SF
Van Dyke to I-94 WB	9,116	SF
I-94 WB to Mt. Elliot	8,590	SF
Mt. Elliot to I-94 WB	8,597	SF
I-94 WB to Chene	10,687	SF
Chene to I-94 WB	3,575	SF
I-94 EB to Chene	7,634	SF
Chene to I-94 EB	5,502	SF
I-94 EB to Mt. Elliot	6,326	SF
Mt. Elliot to I-94 EB	8,620	SF
I-94 EB to Van Dyke	9,003	SF
Van Dyke to I-94 EB	10,073	SF
I-94 EB to Gratiot	3,943	SF
Gratiot to I-94 EB	7,419	SF
I-94 EB to Conner	8,820	SF
Conner to I-94 EB	19,594	SF
	182,660	SF
	790,380	**SY**
	770,093	**SY**
	$71,134,200	
	$69,308,410	
	$1,825,790	

Exhibit 8.3

ASPHALT PAVEMENT (6/12 SECTION)
Areas taken from level 50 of the Mod 1 drawings
Areas include median and all shoulders
Ramps included along I-94 from I-75 to POE

WB Service Drive

	Qunat.	Unit
POE to Trumbul	157,580	SF
Trumbul to M-10	110,739	SF
M-10 to I-75	300,692	SF
I-75 to St. Aubin	81,756	SF
St. Aubin to Chene	135,636	SF
Chene to E. Grand	180,945	SF
E. Grand to Mt. Elliot	87,484	SF
Mt. Elliot approach	23,484	SF
Mt. Elliot to Van Dyke	183,952	SF
Van Dyke to French	267,145	SF
French to Conner	84,926	SF
Conner Approach	150,827	SF

EB Service Drive

POE to Trumbul	124,636	SF
Trumbul approach	13,394	SF
Trumbul to 2nd St	78,137	SF
2nd to I-75	158,309	SF
I-75 to Russel	68,670	SF
Russel to Gratiot	589,526	SF
Mt. Elliot approach	17,113	SF
Gratiot approach	49,493	SF
Gratiot to POE	340,578	includes conner approach
approaches to Conner	6,423	SF

M-10 Service Drive

NB	42,899	SF
SB	67,500	SF
SB Ramp	8,285	SF

I-75 Service Drive

North of I-94	122,516	SF
NB	68,671	SF
SB	46,921	SF
Subtotal	3,568,237	SF
Total (VE Estimate)	**3,385,577**	**SF**
Total (DEIS Estimate)	**3,614,508**	**SF**
Difference=		

Ramps I-75 to POE

	Quant.	Unit
I-94 WB to Conner	19,803	SF
Conner to I-94 WB	10,036	SF
I-94 WB to Gratiot	7,418	SF
Gratiot to I-94 WB	7,831	SF
I-94 WB to Van Dyke	10,073	SF
Van Dyke to I-94 WB	9,116	SF
I-94 WB to Mt. Elliot	8,590	SF
Mt. Elliot to I-94 WB	8,597	SF
I-94 WB to Chene	10,687	SF
Chene to I-94 WB	3,575	SF
I-94 EB to Chene	7,634	SF
Chene to I-94 EB	5,502	SF
I-94 EB to Mt. Elliot	6,326	SF
Mt. Elliot to I-94 EB	8,620	SF
I-94 EB to Van Dyke	9,003	SF
Van Dyke to I-94 EB	10,073	SF
I-94 EB to Gratiot	3,943	SF
Gratiot to I-94 EB	7,419	SF
I-94 EB to Conner	8,820	SF
Conner to I-94 EB	19,594	SF
	182,660	SF

376,175 SY
401,612 SY
Note: DEIS Estimate includes Asphalt and Mill and Overlay quantities

25,437 SY X $11.70/SY = $297,610

Exhibit 8.4

Appendix D
Value Engineering Cost Model (May 2004)

Enhancement

Allowance
- Allowance is assumed to be 4% of the total base cost.
  0.04($334,934,000) = $13,397,000

Contingency
- Contingency is assumed to be 0% of the total base cost.
  = $0

Reserve
- Reserve is assumed to be 2% of the total base cost.
  0.02($334,934,000) = $6,699,000

Right-of-Way (ROW)

Allowance:
- Allowance is assumed to be $35 million.

Contingency:
- Contingency is assumed to be $15 million.

Reserve:
- Reserve is assumed to be $0 million.

Mobilization

Allowance:
A factor of 5% of Base Cost ($334,934,000) plus the following allowances were used:

Utility Relocation	$10,690,000
Traffic Control	$19,170,000
Drainage	$3,000,000
Bridges	$35,561,000
Removal of Structures	$3,908,000
Retaining Walls	$21,038,000
Pavement	$26,208,000
Enhancement	$13,397,000
	$132,972,000

.05 x ($334,934,000 + $132,972,000) = $23,395,000

Contingency:
A factor of 1% of the following contingencies were used.

Utility Relocation	$10,690,000
Traffic Control	$10,790,000
Drainage	$7,400,000
Bridges	$25,329,000
Removal of Structures	$0
Retaining Walls	$27,750,000
Pavement	$11,072,000
Enhancement	$ 0
	$93,031,000

.01 x $93,031,000 = $930,000

Reserve:
- Reserve is assumed to be 0%. $0

Engineering Fee

Allowance:
A factor of 25% of Base Cost ($334,934,000) plus the following allowances were used:

Utility Relocation	$10,690,000
Traffic Control	$19,170,000
Drainage	$3,000,000
Bridges	$35,561,000
Removal of Structures	$3,908,000
Retaining Walls	$21,038,000
Pavement	$26,208,000
Enhancement	$13,397,000
	$132,150,000

.25 x ($334,934,000 + $132,972,000) = $116,977,000

Contingency:
A factor of 25% of the following contingencies were used.

Utility Relocation	$10,690,000
Traffic Control	$10,790,000
Drainage	$7,400,000
Bridges	$25,329,000
Removal of Structures	$0
Retaining Walls	$27,750,000
Pavement	$11,072,000
Enhancement	$ 0
	$ 93,031,000

.25 x $93,031,000 = $23,258,000

Reserve
A factor of 25% of the following reserves were used.

Utility Relocation	$0
Traffic Control	$50,000,000
Drainage	$40,600,000
Bridges	$37,722,000
Removal of Structures	$1,037,000
Retaining Walls	$23,125,000
Pavement	$3,691,000
Enhancement	$ 6,699,000
	$162,874,000

.25 x $162,874,000 = $40,719,000

Appendix E
Value Engineering Cost Model (Revised June 2004)

Value Engineering Cost Model (Revised June 2004)

Introduction

The cost estimate for the proposed I-94 reconstruction and widening is shown below (taken from the VE Report dated May 2004 and revised June 2004 to reflect additional costs to bridges for national security, ITS and associated engineering costs. See Reserve page 46). The cost estimate is presented in conformance with ASTM Standard Classification for Allocated Sums in Construction. In conventional estimating, a percentage of the estimated construction cost will be added as a contingency to compensate for design and construction unknowns (changes and risks) at the concept phase, such as utilities and right-of-way. ASTM has developed a process in which these contingencies are divided into three parts; allowance, contingency and reserve. In this way, the intent of each are explained and the purpose of cost allocation will be well defined.

The costs corresponding to the four cost categories described below are combined to form three successive levels of cost totals: minimum, expected and maximum cost estimates.

VE Cost Summary

Base Cost	$334,934,000	
Allowance	$308,344,000	
Total Minimum Construction Cost (2001)		$643,200,000
Total Minimum Construction Cost (2002)		$675,400,000
Total Minimum Construction Cost (2004)		$744,600,000
Contingency	$132,219,000	
Total Expected Construction Cost (2001)		$775,400,000
Total Expected Construction Cost (2002)		$814,200,000
Total Expected Construction Cost (2004)		$897,700000
Reserve	$203,593,000	
Total Max. Construction Cost (2001)		**$1,012,300,000**
Total Max. Construction Cost (2002)		**$1,062,900,000**
Total Max. Construction Cost (2004)		**$1,171,800,000**

Minimum Construction Cost

The minimum construction cost is an estimate of all construction work that will be the basis to forecast a reasonable construction cost. It includes base costs and certain allowance costs.

Base Cost

Base costs are developed from easily quantifiable, well-known, and reliable quantities and unit costs. The base costs are the known costs of the project. It is a sum of money intended to be spent. For example, the $14.2 million cost to retrofit the Dequindre Bridge to accommodate the proposed mainline cross section is a base cost. The base cost for the cost model is the DEIS estimate from Exhibit 4.1 (VE Report dated May 2004) with two revisions; reduced costs for "Drainage" and "Pump Stations" as defined in the drainage section.

Allowance

The allowance ensures a full and complete estimate.

The allowance is a sum of money intended to be spent. However, unlike base costs, allowances are used in the absence of precise knowledge, and estimated to ensure a full and complete estimate. Allowances cover events and activities that are normally internal and so are directly controllable within the project plan. There are two types of allowance costs, specific and nonspecific. Where the content of the sum is uniquely identified and the sum is calculated solely for that purpose, it is specific. When the content of the sum is broadly identified and the sum is calculated for general purpose, it is nonspecific. For example, $35.6 million has been included in the allowance to account for the difference in the DEIS total bridge cost and VE estimate for bridges.

Base Cost

Item	Unit	Unit Cost	Quantity	Total
Asphalt Pavement (6/12 Section)	sq yd	$11.70	333,170	$3,898,000
Concrete Pavement (12/12 Section)	sq yd	$90.00	770,093	$69,308,000
3" Mill and Overlay	sq yd	$9.00	68,442	$616,000
Removal of Surfacing	sq yd	$1.70	1,247,543	$2,121,000
Curb and Gutter	ft	$7.65	206,080	$1,577,000
Sidewalk	sq ft	$2.50	530,714	$1,327,000
Concrete Median Pavement	sq ft	$3.40	129,700	$441,000
Bridges	sq ft	N/A	N/A	$141,023,000
Retaining Walls	sq ft	$60.00	343,114	$20,587,000
Removal of Structures	lsum	$19,876,000.00	1	$19,876,000
Signals	per inters.	$100,000.00	52	$5,200,000
Lighting	lsum	$10,000,000.00	1	$10,000,000
Signing	lsum	$13,000,000.00	1	$13,000,000
Striping	lsum	$241,000.00	1	$241,000
RR Crossing	per xing	$100,000.00	4	$400,000
Drainage	lsum	$15,819,000.00	1	$15,819,000
Pump Stations	ea	$2,000,000.00	4	$8,000,000
Concrete Wall Barrier	ft	$90.00	150,000	$13,500,000
Landscaping	lsum	$8,000,000.00	1	$8,000,000
Total Base Cost				**$334,900,000**

Allowance

Specific Allowances	
Utility Relocation	$10,690,000
Traffic Control	$19,170,000
Drainage	$3,000,000
Bridges	$35,561,000
Removal of Structures	$3,908,000
Retaining Walls	$21,038,000
Pavement	$26,208,000
Enhancement	$13,397,000
ROW	$35,000,000
Mobilization	$23,395,000
Engineering Fee	$116,968,000
Non-Specific Allowances	
Total Allowance	**$308,300,000**

Base Cost		**$334,900,000**
Allowance	**+**	**$308,300,000**
Total Minimum Construction Cost (2001)	**=**	**$643,200,000**
Total Minimum Construction Cost (2002)	**=**	**$675,400,000**
Total Minimum Construction Cost (2004)	**=**	**$744,600,000**

Expected Construction Cost

The expected construction estimate includes the total minimum construction estimate plus both specific and nonspecific contingency costs.

Contingency

The contingency is a sum of money not intended to be spent. It is used in the absence of precise knowledge, and estimated to ensure that a financial buffer is available within a budget. This buffer is intended to assist in mitigating the effects of unplanned events and other risks that are normally external to the project plan and so are not directly controllable. For example, the $16.5 million additional cost to widen the Dequindre Bridge shoulder from the proposed four feet to the recommended 14 ft. is included in the contingency.

Maximum Construction Cost

The maximum construction estimate includes the expected construction estimate plus both specific and nonspecific reserve costs.

Reserve

The reserve is a sum of money usually held by the management (client) and not normally intended to be spent. It is used to provide insurance against a project or program failing to complete on budget or for the revision of a budget in the case of changed management or program direction and requirement. For example, the $11.2 million additional cost to replace the Dequindre Bridge superstructure in order to eliminate constraints imposed by the existing bridge alignment, profile, and superelevation is included as a reserve cost.

The reserve includes $8.8 million for national Security, $22.3 million for ITS and $2.2 million for associated engineering costs.

The following provides detail for costs associated with each element under Allowance, Contingency and Reserve. The base cost for each element is taken from the DEIS estimate except as noted under drainage.

Utility Relocation

Allowance:
- Allowance for utility relocation for mainline roadway is assumed to be 4% of base costs attributable to mainline roadway.
- Allowance for utility relocation for service drives is assumed to be 5% of base costs attributable to service drives.
- Allowance for utility relocation for bridges is estimated to be 2% of base costs attributable to bridges.

Contingency:
- Contingency is 100% of the total utility allowance.

Reserve:
- Reserve is 0% of the total utility allowance.

Contingency

Specific Contingencies	
Utility Relocation	$10,690,000
Traffic Control	$10,790,000
Drainage	$7,400,000
Bridges	$16,500,000
Removal of Structures	$0
Retaining Walls	$27,750,000
Pavement	$11,072,000
Enhancement	$0
ROW	$15,000,000
Mobilization	$930,000
Engineering Fee	$23,258,000
Non-Specific Contingencies	
Bridges	$8,829,000
Total Contingency	**$132,200,000**

Reserve

Specific Reserve	
Utility Relocation	$0
Traffic Control	$50,000,000
Drainage	$40,600,000
Bridges	$37,722,000
Removal of Structures	$1,037,000
Retaining Walls	$23,125,000
Pavement	$3,691,000
Enhancement	$6,699,000
ROW	$0
Mobilization	$0
ITS	$22,300,000
Engineering Fee	$42,900,000
Non-Specific Reserve	
Bridges	$8,829,000
Total Reserve	**$236,900,000**

Total Minimum Construction Cost		**$643,200,000**
Contingency	+	**$132,200,000**
Total Expected Construction Cost (2001)	=	**$775,400,000**
Total Expected Construction Cost (2002)	=	**$814,200,000**
Total Expected Construction Cost (2004)	=	**$897,700,000**

Expected Cosnstruction Cost		**$775,400,000**
Reserves	+	**$236,900,000**
Total Maximum Construction Cost (2001)	=	**$1,012,300,000**
Total Maximum Construction Cost (2002)	=	**$1,062,900,000**
Total Maximum Construction Cost (2004)	=	**$1,171,800,000**

Allowance

	Base Cost 2001		Utilities Relocation		Element	Percentage
Interchange M-10		$75.73		$2.15	Mainline Roadway	4%
Bridges	$44.04		$0.88		Service Roads	5%
Roadway	$31.70		$1.27		Bridges	2%
Interchange I-75		$72.80		$1.73		
Bridges	$58.97		$1.18			
Roadway	$13.83		$0.55			
Interchange Gratiot		$3.45		$0.14		
Interchange Conner		$3.39		$0.14		
Mainline		$96.09		$3.84		
I-96 to M-10	$17.89		$0.72			
M-10 to I-75	$19.98		$0.80			
I-75 to Conner	$58.22		$2.33			
Service Roads		$33.98		$1.70		
I-96 to M-10	$8.15		$0.41			
M-10 to I-75	$6.93		$0.35			
I-75 to Gratiot	$1.26		$0.06			
Gratiot to Conner	$17.64		$0.88			
Bridges		$49.46		$0.99		
I-96 to M-10	$6.63		$0.13			
M-10 to I-75	$12.36		$0.25			
I-75 to Conner	$30.47		$0.61			
	2001 Total	**$334.90**	**Allowance**	**$10.69**		
Contingency						
					Element	**Allowance**
Contingency Total				**$10.69**	Utilities	100%
Reserve						
					Element	**Allowance**
Reserve Total				**$0.00**	Utilities	0%
Utilities Total				**$21.37**		

Utility Relocation

Traffic Control

The DEIS cost estimate is based on unknown MOT, construction staging and scheduling schemes. Various options are discussed in "Validation #5 - Construction Staging and Scheduling." The allowance is based on a seven-year construction duration and full closure by segment and includes staging and other construction activities. A higher percentage is used for the mainline construction and a lesser percentage is used for service drive construction.

Allowance:

- Allowance for traffic control for mainline roadway is assumed to be 5% of base costs attributable to mainline roadway.
- Allowance for traffic control for service drives is assumed to be 3% of base costs attributable to service drives.
- Allowance for traffic control for bridges (non-interchange) is assumed to be 5% of base costs attributable to bridges (non-interchange). The bridge percentage is calculated as follows: {$25,000/[(60 ft. x 200 ft.) x $75/sq ft.]} x 100% = 3%, say 5%. [See MDOT Design Manual 3.01.02 maintaining traffic and bridge cost.]
- Allowance for traffic control for interchanges, which includes interchange roadways and bridges, is assumed to be 7% of base costs attributable to interchange bridges and roadway.

Contingency:

- Contingency for traffic control for mainline roadway is assumed to be 2% of base costs attributable to mainline roadway.
- Contingency for traffic control for service drives is assumed to be 1% of base costs attributable to service drives.
- Contingency for traffic control for bridges (non-interchange) is assumed to be 2% of base costs attributable to bridges (non-interchange).
- Contingency for traffic control for interchanges, which includes interchange roadways and bridges, is assumed to be 3% of base costs attributable to interchange bridges and roadway.

Reserve:

- A $50 million reserve is allocated to cover the cost of leaving I-94 open and maintaining traffic.

Traffic Control

Allowance

	Base Cost 2001		Traffic Control	
Interchange M-10		**$75.73**		**$5.30**
Bridges	$44.04		$3.08	
Roadway	$31.70		$2.22	
Interchange I-75		**$72.80**		**$5.10**
Bridges	$58.97		$4.13	
Roadway	$13.83		$0.97	
Interchange Gratiot		**$3.45**		**$0.24**
Interchange Conner		**$3.39**		**$0.24**
Mainline		**$96.09**		**$4.80**
I-96 to M-10	$17.89		$0.89	
M-10 to I-75	$19.98		$1.00	
I-75 to Conner	$58.22		$2.91	
Service Roads		**$33.98**		**$1.02**
I-96 to M-10	$8.15		$0.24	
M-10 to I-75	$6.93		$0.21	
I-75 to Gratiot	$1.26		$0.04	
Gratiot to Conner	$17.64		$0.53	
Bridges		**$49.46**		**$2.47**
I-96 to M-10	$6.63		$0.33	
M-10 to I-75	$12.36		$0.62	
I-75 to Conner	$30.47		$1.52	

Element	Percentage
Mainline Roadway	5%
Service Roads	3%
Bridges*	5%
Interchanges (Bridges and Roadway)	7%

Base Costs 2001 Total	$334.90	Traffic Control Allowance Total	$19.17

Contingency

	Base Cost 2001		Traffic Control	
Interchange M-10		**$75.73**		**$2.27**
Bridges	$44.04		$1.32	
Roadway	$31.70		$0.95	
Interchange I-75		**$72.80**		**$2.18**
Bridges	$58.97		$1.77	
Roadway	$13.83		$0.41	
Interchange Gratiot		**$3.45**		**$0.10**
Interchange Conner		**$3.39**		**$0.10**
Mainline		**$96.09**		**$4.80**
I-96 to M-10	$17.89		$0.36	
M-10 to I-75	$19.98		$0.40	
I-75 to Conner	$58.22		$1.16	
Service Roads		**$33.98**		**$0.34**
I-96 to M-10	$8.15		$0.08	
M-10 to I-75	$6.93		$0.07	
I-75 to Gratiot	$1.26		$0.01	
Gratiot to Conner	$17.64		$0.18	
Bridges		**$49.46**		**$0.99**
I-96 to M-10	$6.63		$0.13	
M-10 to I-75	$12.36		$0.25	
I-75 to Conner	$30.47		$0.61	

Element	Percentage
Mainline Roadway	2%
Service Roads	1%
Bridges*	2%
Interchanges (Bridges and Roadway)	3%

Contingency Total	$10.79

Reserve

Reserve Total	$50.00

Traffic Control Total	$79.97

Traffic Control

Drainage

DEIS cost estimate included $22.2 million for drainage and $12 million for pump stations for a total of $34.2 million as shown below.

DRAINAGE QUANTITIES			
36" RCP			
	Length	**Unit Cost**	**Cost**
WB Frontage	34,730	$75.00	$2,604,750.00
EB Frontage	33,645	$75.00	$2,523,375.00
M-10 SB Frontage	7,600	$75.00	$570,000.00
M-10 NB Frontage	7,600	$75.00	$570,000.00
Subtotal			**$6,268,125.00**
60" RCP			
	Length	**Unit Cost**	**Cost**
WB Mainline	36,170	$145.00	$5,244,650.00
EB Mainline	35,640	$145.00	$5,167,800.00
M-10 SB	7,600	$145.00	$1,102,000.00
M-10 NB	7,600	$145.00	$1,102,000.00
Subtotal			**$12,616,450.00**
Drop Inlets (every 300' on ML & M-10; every 400' on service roads)			
	Quantity	**Unit Cost**	**Cost**
WB Frontage	88	$4,200.00	$369,600.00
EB Frontage	84	$4,200.00	$352,800.00
WB Mainline	242	$4,200.00	$1,016,400.00
EB Mainline	238	$4,200.00	$999,600.00
M-10 SB	52	$4,200.00	$218,400.00
M-10 NB	52	$4,200.00	$218,400.00
M-10 SB Frontage	19	$4,200.00	$79,800.00
M-10 NB Frontage	19	$4,200.00	$79,800.00
Subtotal			**$3,334,800.00**
Pump Stations	6	$200,000.00	**$12,000,000.00**
Total			**$34,219,375.00**

Drainage Cost (DEIS)

The base cost for drainage and pump stations reflects the combination of VE options 1 and 2 as described in Validation 4.

The base cost reflects the estimated savings of $10.4 million (drainage - $6.2 million and pump station - $4.2 million); therefore the base cost has been reduced to $23.8 million.

Allowance:
The base cost does not include a pump station at the I-94/ I-96 interchange. Three million dollars has been included in the allowance to cover the cost if further detailed design requires the pump station.

- Allowance is $3,000,000

Contingency:
The contingency provide for construction of the drainage system provided in the DEIS in the event this is required for phased construction.

- Contingency is $7,400,000

Reserve:
VE Option 3 provided for the construction of a separate storm water system independent of the combined city system.

- Reserve is $40,600,000

Bridges

Prior to the cost model analysis, the VE team reviewed the DEIS cost estimate for bridges and removal of structures. It did not correlate with the Recommended Alternative exhibits. The VE team developed the tables 8.1 and 8.2 based on the Recommended Alternative exhibits. Structure numbers, where applicable, were provided by MDOT and have been added to the table.

Allowance:

- The allowance accounts for the difference between the DEIS cost estimate and the validated study cost estimate, except for the two GTW/Conrail bridges that are included in the reserve. This validation detail is shown Table 8.1. The difference in cost between DEIS and VE estimate is $35,561,000, which includes $4 million for the bridges required for the work on M-10 not included in the DEIS estimate.

Contingency:

- Nonspecific contingency is assumed to be 5% of the sum of the bridge base cost plus bridge allowance. This will cover the walled-in area of bridges due to potential changes in profile, geometry, and construction staging of bridges.

- DEIS cost estimate for Dequindre bridge widening is $14.2 million. If the widening is not feasible and 14 ft. median is desired, cost of this improvement should be added to the contingency ($30,700,000 - $14,200,000) $16,500,000.

Nonspecific Contingency
.05($141,023,000 + $35,561,000) = $8,829,000
Specific Contingency
Dequindre Widening $16,500,000
$25,329,000

Reserve:

- Nonspecific reserve is assumed to be 5% of the sum of the bridge base cost plus bridge allowance.
- The first specific reserve is $17,693,000 for the two GTW/Conrail bridges not included in the DEIS cost estimate.
- The second specific reserve is for the additional cost if the Dequindre bridge, Option 6 as outlined in Validation 3a, is adopted ($41,900,000 - $30,700,000) $11,200,000.
- The fourth specific reserve is added for enhancing the stability of the bridges to improve their ability to withstand explosions from beneath for national security. This amount is assumed to be five percent of total base cost plus allowance .
.05($141,022,850 + $35,562,000) = $8,829,000

Nonspecific Reserve
.05($141,023,000 + $35,561,000) = $8,829,000
Specific Reserve
GTW/Conrail bridges $17,693,000
Dequindre Widening $11,200,000
National Security $ 8,829,000
$46,551,000

Removal of Structures

Allowance:

- Accounts for the difference between the DEIS quantity estimate and the VE Study cost estimate, except for the two GTW/Conrail bridges included in the reserve. The increase does account for $0.5 million for work on M-10 not included in the DEIS estimate. The validation detail is shown in Table 8.2.
- Allowance is calculated as $3,908,000.

Contingency:

- Contingency is assumed to be $0.

Reserve:

- Reserve is calculated as $1,037,000 to account for the two GTW/Conrail bridges not accounted for in the draft EIS cost estimate.

Appendix E
Value Engineering Cost Model (Revised June 2004)

	Bridge Cost Validation		Construction Length	Width	Area	Unit Cost	Total
	Grand River	S17 of 82023	240	119	28560	$ 80.00	$ 2,284,800.00
	Linwood	S18 of 82023	190	68	12920	$ 80.00	$ 1,033,600.00
	14th Street	S19 of 82023	215	64	13760	$ 80.00	$ 1,100,800.00
	GT Western Conrail (E) over Wabash*	NOT NUMBERED	80	40	5600	$ 465.00	$ 2,604,000.00
	Rosa Parks	S20 of 82023	235	56	13160	$ 80.00	$ 1,052,800.00
	Trumbull	S21 of 82023	270	94	25380	$ 80.00	$ 2,030,400.00
	GTW/Conrail Bridge (N) over M-10	X01 of 82112	350	24	8400	$ 465.00	$ 3,906,000.00
	GTW/Conrail Bridge (S) over M-10	X01 of 82112	360	40	14400	$ 465.00	$ 6,696,000.00
	Holden Ped Bridge	P01 of 82112			11200	$ 80.00	$ 896,000.00
	Brooklyn St. Ped Bridge	P05 of 82023			0	-	-
M-10 Interchange	I-94 WB to M-10 SB (West to South)	S26 of 82023			0	-	-
	M-10 SB over M-10 NB to I-94 WB	S22 of 82023			0	-	-
	M-10 NB (Mainline)	S27 of 82023			0	-	-
	M-10 SB (Mainline)	S24 of 82023			0	-	-
	M-10 NB over I-94 WB to M-10 SB	S29 of 82023			0	-	-
	I-94 EB to M-10 NB (East to North)	S25 of 82023			0	-	-
	I-94 EB over I-94 EB to M-10 SB (East)	S23 of 82023			0	-	-
	I-94 WB over M-10 SB to I-94 EB	S28 of 82023			0	-	-
	I-94 EB SD to M-10 SB SD (East to South)				28500	$ 120.00	$ 3,420,000.00
	I-94 EB SD to M-10 NB SD (East to North)				51000	$ 120.00	$ 6,120,000.00
	I-94 WB SD to M-10 SB SD (West to South)				53700	$ 120.00	$ 6,444,000.00
	I-94 WB SD to M-10 NB SD (West to North)				30900	$ 120.00	$ 3,708,000.00
	M-10 NB to I-94 WB (North to West)				34500	$ 120.00	$ 4,140,000.00
	M-10 NB to I-94 EB (North to East)				24000	$ 120.00	$ 2,880,000.00
	M-10 SB to I-94 EB (South to East)				31500	$ 120.00	$ 3,780,000.00
	M-10 SB to I-94 WB (South to West)				19500	$ 120.00	$ 2,340,000.00
	M-10 NB (Mainline)				20400	$ 100.00	$ 2,040,000.00
	M-10 SB (Mainline)				23800	$ 100.00	$ 2,380,000.00
	M-10 NB SD (North Service)				10105	$ 180.00	$ 1,818,900.00
	M-10 SB SD (South Service)				10200	$ 180.00	$ 1,836,000.00
	Merrick Ave Ped Brridge	P07 of 82111			13400	$ 80.00	$ 1,072,000.00
	Warren Ave Bridge	S19 of 82111	160	124	19840	$ 80.00	$ 1,587,200.00
	Forest Ave Bridge	S18 of 82111	150	114	17100	$ 80.00	$ 1,368,000.00
	Canfield Ave Ped Bridge	P06 of 82111			0	-	-
	U-Turn Bridge (south on M-10) ?? Not in scope				0	-	-
	Third Ave.	S30 of 82023			0	-	-
	Second Ave.	S01 of 82024	270	89	24030	$ 80.00	$ 1,922,400.00
	Cass	S02 of 82024	205	66	13530	$ 80.00	$ 1,082,400.00
	Woodward	S03 of 82024	220	114	25080	$ 80.00	$ 2,006,400.00
	John R	S04 of 82024			0	-	-
	Brush	S05 of 82024	255	78	19890	$ 80.00	$ 1,591,200.00
	Beaubien	S06 of 82024			0	-	-
	Milwaukee St. over I-75	S02 of 82252	240	64	15360	$ 80.00	$ 1,228,800.00
	Abandoned RR Bridge	NOT NUMBERED			0	-	-
	Abandoned RR Bridge	NOT NUMBERED			0	-	-
	Piquette St. over I-75	S01 of 82252			0	-	-
	Ferry St. over I-75	S20 of 82251			0	-	-
	I75/I94	S27 of 82251			0	-	-
	I-75 SB to I-94 WB	S28 of 82251			0	-	-
I-75 Interchange	I-94 WB to I-75 SB over I-94	S24 of 82251			0	-	-
	I-75 SB to I-94 EB over I-75 and I-94	S30 of 82251			0	-	-
	94 W to 75S (West to South) over I-75	S29 of 82251			0	-	-
	94E to 75N (East to North)	S26 of 82251			0	-	-
	NBD I-75 to WBD I-94	S25 of 82251			0	-	-
	I-94 EB Ent ramp	S21 of 82251			0	-	-
	I-94 EB to I-75 NB over I-75	S23 of 82251			0	-	-
	I-94 WB to I-75 SB over I-94E to I75 N	S22 of 82251			0	-	-
	94E to 75N (East to North)				71036	$120.00	$ 8,524,320.00
	75 to 94W (N.&S. to West)				47019	$120.00	$ 5,642,280.00
	94W to 75S (West to South)				81989	$120.00	$ 9,838,680.00
	75 to 94E (N.&S. to East)				48443	$120.00	$ 5,813,160.00
	75S to 94 (South)				12476	$200.00	$ 2,495,200.00
	75N to 94 (North)				18281	$200.00	$ 3,656,200.00
	94 over 75 (I-94)				48839	$100.00	$ 4,883,900.00
	W Service over 75 (West Service)				8533	$100.00	$ 853,300.00
	E Service over 75 (East Service)				13512	$100.00	$ 1,351,200.00
	1 Service over 94Eto75S (East Service)				2478	$180.00	$ 446,040.00
	2 Service over 94Eto75S (South Service)				3528	$180.00	$ 635,040.00
	Service over 94Wto75N (North)				5011	$180.00	$ 901,980.00
	Widen/Rebuild Dequindre (I-94)				102762	$150.00	$ 15,414,300.00
	Misc I-75 Bridge Costs						$ 4,215,000.00
	Chene ramp to I-94	S17 of 82024			0	-	-
	Chene	S08 of 82024	190	78	14820	$ 80.00	$ 1,185,600.00
	E. Grand	S09 of 82024	200	94	18800	$ 80.00	$ 1,504,000.00
	Lucky Place	S18 of 82024			0	-	-
	Saginaw U Turn	S19 of 82024			0	-	-
	M. Elliott	S10 of 82024	190	204	38760	$ 80.00	$ 3,100,800.00
	Harper EB	S16 of 82024			0	-	-
	Conrail RR	X02 of 82024	310	50	15500	$ 465.00	$ 7,207,500.00
	Concord	S11 of 82024	200	49	9800	$ 80.00	$ 784,000.00
	Helen Ped	P04 of 82024			8880	$ 80.00	$ 710,400.00
	Frontenac	S12 of 82024	200	54	10800	$ 80.00	$ 864,000.00
	Townsend Ped	P05 of 82024			9120	$ 80.00	$ 729,600.00
	Van Dyke	S13 of 82024	185	92	17020	$ 80.00	$ 1,361,600.00
	Iroquois Ped	P06 of 82024			11800	$ 80.00	$ 944,000.00
	Burns	S14 of 82024	200	54	10800	$ 80.00	$ 864,000.00
	Rohns Ped	P07of 82024			11400	$ 80.00	$ 912,000.00
	McClellan	S 15 of 82025			0	-	-
	Gratiot	S01 of 82025	240	168	40320	$ 80.00	$ 3,225,600.00
	Cadillac	S02 of 82025	200	56	11200	$ 80.00	$ 896,000.00
	French	S03 of 82025	190	54	10260	$ 80.00	$ 820,800.00
	Springfield Ped	P02 of 82025			9120	$ 80.00	$ 729,600.00
	Conrail RR	X01 of 82025	335	55	18425	$ 465.00	$ 8,567,625.00
	Conrail RR (Spur)	X01 of 82025					
	Conner		150	173	25950	$ 80.00	$ 2,076,000.00
	West Conner	S04 of 82025					
	East Conner	S05 of 82025					
	Malcolm Ped	P03 of 82025			5160	$ 80.00	$ 412,800.00
	Barrett	S06 of 82025	150	54	8100	$ 80.00	$ 648,000.00

Totals (As Proposed) **$ 176,584,225.00**

Totals (As Designed) **$ 141,022,850.00**

Difference **$ 35,561,375.00**

GT Western Conrail (W) over I-94*	X02 of 82023	450	35	17250	$ 465.00	$ 8,021,250.00
GT Western Conrail (E) over I-94*	X02 of 82023	460	40	20800	$ 465.00	$ 9,672,000.00

* Includes Cost of Railroad bridges removed and replaced over Kirby

$ 17,693,250.00

Assumptions
Removal Costs: Widths taken from aerial, lengths taken from Report 44 (Bridge Inventory Report)
Construction Costs: Widths taken from aerial, add 7' to each side for sidewalk in areas it applies.
Length of bridges taken from aerial and added 10' from edge of metal to face of full height abutment.

Bridge Costs(per square foot):
Construction

Pedestrian bridge	$80.00 /SF
Local street bridges	$80.00 /SF
Mainline over mainline bridges	$100.00 /SF
Directional ramp bridges	$120.00 /SF
Dequindre widening	$150.00 /SF
Service drive bridges	$180.00 /SF
Braided ramp bridges	$200.00 /SF
Railroad bridges	$465.00 /SF

Table 8.1
Bridge Construction Cost
VE Estimate

	Bridge Cost Validation		Removal Length	Width	Area	Unit Cost	Total
	Grand River	S17 of 82023	251	100	25100	$ 25.00	$ 627,500.00
	Linwood	S18 of 82023	173	62	10726	$ 25.00	$ 268,150.00
	14th Street	S19 of 82023	166	80	13280	$ 25.00	$ 332,000.00
	GT Western Conrail (E) over Wabash*	NOT NUMBERED	80	40	5600	$ 45.00	$ 252,000.00
	Rosa Parks	S20 of 82023	120	50	6000	$ 25.00	$ 150,000.00
	Trumbull	S21 of 82023	210	88	18480	$ 25.00	$ 462,000.00
	GTW/Conrail Bridge (N) over M-10	X01 of 82112	155	24	3720	$ 45.00	$ 167,400.00
	GTW/Conrail Bridge (S) over M-10	X01 of 82112	142	40	5680	$ 45.00	$ 255,600.00
	Holden Ped Bridge	P01 of 82112	289	12	3468	$ 15.00	$ 52,020.00
	Brooklyn St. Ped Bridge	P05 of 82023	347	12	4164	$ 15.00	$ 62,460.00
M-10 Interchange	I-94 WB to M-10 SB (West to South)	S26 of 82023	1158	45	52110	$ 25.00	$ 1,302,750.00
	M-10 SB over M-10 NB to I-94 WB	S22 of 82023	232	60	13920	$ 25.00	$ 348,000.00
	M-10 NB (Mainline)	S27 of 82023	297	50	14850	$ 25.00	$ 371,250.00
	M-10 SB (Mainline)	S24 of 82023	297	50	14850	$ 25.00	$ 371,250.00
	M-10 NB over I-94 WB to M-10 SB	S29 of 82023	224	55	12320	$ 25.00	$ 308,000.00
	I-94 EB to M-10 NB (East to North)	S25 of 82023	1134	45	51030	$ 25.00	$ 1,275,750.00
	I-94 EB over I-94 EB to M-10 SB (East)	S23 of 82023	186	55	10230	$ 25.00	$ 255,750.00
	I-94 WB over M-10 SB to I-94 EB	S28 of 82023	196	55	10780	$ 25.00	$ 269,500.00
	I-94 EB SD to M-10 SB SD (East to South)						
	I-94 EB SD to M-10 NB SD (East to North)						
	I-94 WB SD to M-10 SB SD (West to South)						
	I-94 WB SD to M-10 NB SD (West to North)						
	M-10 NB to I-94 WB (North to West)						
	M-10 NB to I-94 EB (North to East)						
	M-10 SB to I-94 EB (South to East)						
	M-10 SB to I-94 WB (South to West)						
	M-10 NB (Mainline)						
	M-10 SB (Mainline)						
	M-10 NB SD (North Service)						
	M-10 SB SD (South Service)						
	Merrick Ave Ped Brridge	P07 of 82111	318	14	4452	$ 15.00	$ 66,780.00
	Warren Ave Bridge	S19 of 82111	127	140	17780	$ 25.00	$ 444,500.00
	Forest Ave Bridge	S18 of 82111	111	103	11433	$ 25.00	$ 285,825.00
	Canfield Ave Ped Bridge	P06 of 82111	148	14	2072	$ 15.00	$ 31,080.00
	U-Turn Bridge (south on M-10) ?? Not in scope						
	Third Ave.	S30 of 82023	421	70	29470	$ 25.00	$ 736,750.00
	Second Ave.	S01 of 82024	214	80	17120	$ 25.00	$ 428,000.00
	Cass	S02 of 82024	190	80	15200	$ 25.00	$ 380,000.00
	Woodward	S03 of 82024	237	125	29625	$ 25.00	$ 740,625.00
	John R	S04 of 82024	172	60	10320	$ 25.00	$ 258,000.00
	Brush	S05 of 82024	171	50	8550	$ 25.00	$ 213,750.00
	Beaubien	S06 of 82024	174	60	10440	$ 25.00	$ 261,000.00
	Milwaukee St. over I-75	S02 of 82252	237	65	15405	$ 25.00	$ 385,125.00
	Abandoned RR Bridge	NOT NUMBERED	215	80	17200	$ 45.00	$ 774,000.00
	Abandoned RR Bridge	NOT NUMBERED	215	35	7525	$ 45.00	$ 338,625.00
	Piquette St. over I-75	S01 of 82252	219	120	26280	$ 25.00	$ 657,000.00
	Ferry St. over I-75	S20 of 82251	240	60	14400	$ 25.00	$ 360,000.00
I-75 Interchange	I75/I94	S27 of 82251	188	130	24440	$ 25.00	$ 611,000.00
	I-75 SB to I-94 WB	S28 of 82251	153	45	6885	$ 25.00	$ 172,125.00
	I-94 WB to I-75 SB over I-94	S24 of 82251	309	40	12360	$ 25.00	$ 309,000.00
	I-75 SB to I-94 EB over I-75 and I-94	S30 of 82251	827	34	28118	$ 25.00	$ 702,950.00
	94 W to 75S (West to South) over I-75	S29 of 82251	186	35	6510	$ 25.00	$ 162,750.00
	94E to 75N (East to North)	S26 of 82251	585	35	20475	$ 25.00	$ 511,875.00
	NBD I-75 to WBD I-94	S25 of 82251	772	35	27020	$ 25.00	$ 675,500.00
	I-94 EB Ent ramp	S21 of 82251	172	30	5160	$ 25.00	$ 129,000.00
	I-94 EB to I-75 NB over I-75	S23 of 82251	307	30	9210	$ 25.00	$ 230,250.00
	I-94 WB to I-75 SB over I-94E to I75 N	S22 of 82251	165	45	7425	$ 25.00	$ 185,625.00
	94E to 75N (East to North)						
	75 to 94W (N.&S. to West)						
	94W to 75S (West to South)						
	75 to 94E (N.&S. to East)						
	75S to 94 (South)						
	75N to 94 (North)						
	94 over 75 (I-94)						
	W Service over 75 (West Service)						
	E Service over 75 (East Service)						
	1 Service over 94Eto75S (East Service)						
	2 Service over 94Eto75S (South Service)						
	Service over 94Wto75N (North)						
	Widen/Rebuild Dequindre (I-94)						
	Misc I-75 Bridge Costs						
	Chene ramp to I-94	S17 of 82024	183	30	5490	$ 25.00	$ 137,250.00
	Chene	S08 of 82024	170	65	11050	$ 25.00	$ 276,250.00
	E. Grand	S09 of 82024	186	120	22320	$ 25.00	$ 558,000.00
	Lucky Place	S18 of 82024	174	45	7830	$ 25.00	$ 195,750.00
	Saginaw U Turn	S19 of 82024	161	60	9660	$ 25.00	$ 241,500.00
	M. Elliott	S10 of 82024	169	70	11830	$ 25.00	$ 295,750.00
	Harper EB	S16 of 82024	171	40	6840	$ 25.00	$ 171,000.00
	Conrail RR	X02 of 82024	120	50	6000	$ 45.00	$ 270,000.00
	Concord	S11 of 82024	168	65	10920	$ 25.00	$ 273,000.00
	Helen Ped	P04 of 82024	171	12	2052	$ 15.00	$ 30,780.00
	Frontenac	S12 of 82024	168	60	10080	$ 25.00	$ 252,000.00
	Townsend Ped	P05 of 82024	194	10	1940	$ 15.00	$ 29,100.00
	Van Dyke	S13 of 82024	167	100	16700	$ 25.00	$ 417,500.00
	Iroquois Ped	P06 of 82024	218	10	2180	$ 15.00	$ 32,700.00
	Burns	S14 of 82024	167	65	10855	$ 25.00	$ 271,375.00
	Rohns Ped	P07of 82024	159	12	1908	$ 15.00	$ 28,620.00
	McClellan	S 15 of 82025	224	55	12320	$ 25.00	$ 308,000.00
	Gratiot	S01 of 82025	284	120	34080	$ 25.00	$ 852,000.00
	Cadillac	S02 of 82025	185	70	12950	$ 25.00	$ 323,750.00
	French	S03 of 82025	171	60	10260	$ 25.00	$ 256,500.00
	Springfield Ped	P02 of 82025	197	10	1970	$ 15.00	$ 29,550.00
	Conrail RR	X01 of 82025	127	50	6350	$ 45.00	$ 285,750.00
	Conrail RR (Spur)	X01 of 82025	125	25	3125	$ 45.00	$ 140,625.00
	Conner						$ -
	West Conner	S04 of 82025	220	60	13200	$ 25.00	$ 330,000.00
	East Conner	S05 of 82025	171	60	10260	$ 25.00	$ 256,500.00
	Malcolm Ped	P03 of 82025	217	12	2604	$ 15.00	$ 39,060.00
	Barrett	S06 of 82025	171	70	11970	$ 25.00	$ 299,250.00

Totals (VE Estimate) **$ 23,784,075.00**

Totals (DEIS Estimate) **$ 19,876,000.00**

Difference **$ 3,908,075.00**

GT Western Conrail (W) over I-94*	X02 of 82023	174	70	13680	$ 45.00	$ 615,600.00
GT Western Conrail (E) over I-94*	X02 of 82023	174	40	9360	$ 45.00	$ 421,200.00

* Includes Cost of of Railroad bridges removed and replaced over Kirby

$ 1,036,800.00

Assumptions
Removal Costs: Widths taken from aerial, lengths taken from Report 44 (Bridge Inventory Report)
Construction Costs: Widths taken from aerial, add 7' to each side for sidewalk in areas it applies.
Length of bridges taken from aerial and added 10' from edge of metal to face of full height abutment.

Bridge Costs(per square foot):
Removal

Pedestrian bridge	$15.00 /SF
Highway or local street bridge	$25.00 /SF
Railroad bridge	$45.00 /SF

Table 8.2
Bridge Demolition Cost
VE Estimate

Appendix E
Value Engineering Cost Model (Revised June 2004)

Retaining Walls

Base Cost:
The total cost of the retaining walls, as shown on DEIS estimate, is $20,587,000 (Appendix A, Item #9). The cost is based on 40,969 linear feet with an average height of 8.38 ft. and using a unit price of $60.00/sf.

Allowance:
The VE team, based on the use of aerials and contour mapping estimated the total length of the wall to be 40,250 linear feet and an average height of 15 ft. Utilizing the same unit price of $60.00/sf. the total cost of the wall will be $41,625,000. In the absence of exact quantities the difference ($41,625,000 - $20,587,000) $21,038,000 is added to the allowance, which includes $10.2 million for reconstruction of 4,300 lf. of M-10 south of the M-10/I-94 interchange.

Contingency:
- Accounts for the difference between a VE study cost estimate that assumes a 15-ft.-high wall with a unit cost of $60/sft. and a VE study cost estimate that assumes a 15-ft.-high wall with a unit cost of $100/sft. The VE team assumes that $100/sft. is an appropriate cost estimate for a 15-ft.-high wall.

- Contingency is calculated as ($69,375,000 - $41,625,000) $27,750,000.

Reserve:
- Accounts for the difference between a VE study cost estimate that assumes a 15-ft.-high wall with a unit cost of $100/sft. and a VE study cost estimate that assumes a 20-ft.-high wall with a unit cost of $100/sft. A 20-ft.-high wall represents an increased wall height that would result if sloped mainline embankment proposed in the DEIS is replaced with retaining walls.

- Reserve is calculated as ($92,500,000 - $69,375,000) $23,125,000.

Pavement

Pavement includes; asphalt pavement, concrete pavement and three inch mill and overlay.

Allowance:
- Accounts for the difference between the DEIS and the validated study cost estimate. The validation detail for mainline and ramps follows. Using the same unit price of $90/sy. the difference between the DEIS and the VE estimate is $1,826,000 as shown on Exhibit 8.3. An additional $17.0 million has been added for concrete pavement for the reconstruction of 4,300 lf. of M-10/I-94 interchange not included in the DEIS estimate.

- An additional allowance is assumed to be 10% of the total base pavement cost. This accounts for all miscellaneous pavement-related cost elements, i.e., underdrains, joints, slope restoration, and the $0.3 million difference between the DEIS and VE estimate for asphalt pavement on crossroads and service drives as shown on Exhibit 8.4.

0.1($3,900,000+$69,300,000+$616,000) = $7,382,000

Difference in Quantity =	$ 1,826,000
M-10 Pavement	$17,000,000
Miscellaneous Related Items	$ 7,382,000
	$26,208,000

Contingency:
- Accounts for unknown field conditions and staging requirements. This includes subgrade and earthwork costs, temporary roadway, and temporary sheeting.

- Contingency is assumed to be 15% of the total base pavement cost.
0.15($3,900,000+$69,300,000+$616,000)= $11,072,000

Reserve:
- Accounts for changes in the pavement concept, i.e., a change in the proposed typical sections, additional lanes or extended limits on crossroads.

- Reserve is assumed to be 5% of the total base pavement cost.
0.05($3,900,000+$69,300,000+$616,000)= $3,691,000

CONCRETE PAVEMENT (12/12 SECTION)

Areas taken from polygons on level 49 of the Mod 1 drawings
Areas include median and all shoulders
Ramps included in polygons along I-94 from POB to I-75 only

I-94 mainline*	Quantity	Unit	**Ramps I-75 to POE**	Quantity	Unit
POB to 2nd St	1,442,632	SF	I-94 WB to Conner	19,803	SF
2nd St to I-75	893,795	SF	Conner to I-94 WB	10,036	SF
I-75 to St. Aubin	2,263,936	SF	I-94 WB to Gratiot	7,418	SF
St Aubin to Gratiot	710,155	SF	Gratiot to I-94 WB	7,831	SF
Gratiot to POE	310,076	SF	I-94 WB to Van Dyke	10,073	SF
			Van Dyke to I-94 WB	9,116	SF
			I-94 WB to Mt. Elliott	8,590	SF
			Mt. Elliott to I-94 WB	8,597	SF
M-10*			I-94 WB to Chene	10,687	SF
POE to I-94	533,808	SF	Chene to I-94 WB	3,575	SF
I-94 to POB	491,226	SF	I-94 EB to Chene	7,634	SF
			Chene to I-94 EB	5,502	SF
I-75 & I-94 Interchange			I-94 EB to Mt. Elliott	6,326	SF
SB I-75 off ramp	23,425	SF	Mt. Elliott to I-94 EB	8,620	SF
SB I-75 to I-94 EB & WB	26,622	SF	I-94 EB to Van Dyke	9,003	SF
EB I-94 to SB I-75	69,302	SF	Van Dyke to I-94 EB	10,073	SF
WB I-94 to I-75 SB	44,973	SF	I-94 EB to Gratiot	3,943	SF
NB I-75 off ramp	38,713	SF	Gratiot to I-94 EB	7,419	SF
NB I-75 to I-94 EB & WB	23,428	SF	I-94 EB to Conner	8,820	SF
SB I-75 to SB CD road	13,037	SF	Conner to I-94 EB	19,594	SF
WB I-94 to I-75 NB	24,167	SF			
EB I-94 to NB I-75	21,465	SF			
Subtotal	6,930,760	SF		182,660	SF
Total (VE Estimate)	**7,113,420**	**SF**	**790,380**	**SY**	
Total (DEIS Estimate)	**6,930,841**	**SF**	**770,093**	**SY**	
VE Cost Estimate	**790380 @$90/SY=**		$71,134,200		
DEIS Cost Estimate	**770093 @$90/SY=**		$69,308,410		
Difference =			$1,825,790		

* I-94/M-10 interchange ramps are included with the I-94 or M-10 mainline quantity.

Exhibit 8.3

ASPHALT PAVEMENT (6/12 SECTION)

Areas taken from level 50 of the Mod 1 drawings
Areas include median and all shoulders
Ramps included along I-94 from I-75 to POE

WB Service Drive

	Quantity	Unit
POE to Trumbull	157,580	SF
Trumbull to M-10	110,739	SF
M-10 to I-75	300,692	SF
I-75 to St. Aubin	81,756	SF
St. Aubin to Chene	135,636	SF
Chene to E. Grand	180,945	SF
E. Grand to Mt. Elliott	87,484	SF
Mt. Elliott approach	23,484	SF
Mt. Elliott to Van Dyke	183,952	SF
Van Dyke to French	267,145	SF
French to Conner	84,926	SF
Conner Approach	150,827	SF

EB Service Drive

POE to Trumbull	124,636	SF
Trumbull approach	13,394	SF
Trumbull to 2nd St	78,137	SF
2nd to I-75	158,309	SF
I-75 to Russell	68,670	SF
Russell to Gratiot	589,526	SF
Mt. Elliott approach	17,113	SF
Gratiot approach	49,493	SF
Gratiot to POE	340,578	includes Conner approach
approaches to Conner	6,423	SF

M-10 Service Drive

NB	42,899	SF
SB	67,500	SF
SB Ramp	8,285	SF

I-75 Service Drive

North of I-94	122,516	SF
NB	68,671	SF
SB	46,921	SF
Subtotal	3,568,237	SF

Ramps I-75 to POE

	Quantity	Unit
I-94 WB to Conner	19,803	SF
Conner to I-94 WB	10,036	SF
I-94 WB to Gratiot	7,418	SF
Gratiot to I-94 WB	7,831	SF
I-94 WB to Van Dyke	10,073	SF
Van Dyke to I-94 WB	9,116	SF
I-94 WB to Mt. Elliott	8,590	SF
Mt. Elliott to I-94 WB	8,597	SF
I-94 WB to Chene	10,687	SF
Chene to I-94 WB	3,575	SF
I-94 EB to Chene	7,634	SF
Chene to I-94 EB	5,502	SF
I-94 EB to Mt. Elliott	6,326	SF
Mt. Elliott to I-94 EB	8,620	SF
I-94 EB to Van Dyke	9,003	SF
Van Dyke to I-94 EB	10,073	SF
I-94 EB to Gratiot	3,943	SF
Gratiot to I-94 EB	7,419	SF
I-94 EB to Conner	8,820	SF
Conner to I-94 EB	19,594	SF
Subtotal	182,660	SF

Total (VE Estimate)	**3,385,577 SF**	**376,175 SY**	
Total (DEIS Estimate)	**3,614,508 SF**	**401,612 SY**	
Note: DEIS Estimate includes Asphalt and Mill and Overlay quantities			
Difference=		**25,437** SY X $11.70/SY =	$297,610

Exhibit 8.4

Appendix E
Value Engineering Cost Model (Revised June 2004)

Enhancement

Allowance
- Allowance is assumed to be 4% of the total base cost.
  0.04($334,934,000) = $13,397,000

Contingency
- Contingency is assumed to be 0% of the total base cost.
  = $0

Reserve
- Reserve is assumed to be 2% of the total base cost.
  0.02($334,934,000) = $6,699,000

Right-of-Way (ROW)

Allowance:
- Allowance is assumed to be $35 million.

Contingency:
- Contingency is assumed to be $15 million.

Reserve:
- Reserve is assumed to be $0 million.

Mobilization

Allowance:
A factor of 5% of Base Cost plus the following allowances were used:

Utility Relocation	$10,690,000
Traffic Control	$19,170,000
Drainage	$3,000,000
Bridges	$35,561,000
Removal of Structures	$3,908,000
Retaining Walls	$21,038,000
Pavement	$26,208,000
Enhancement	$13,397,000
	$132,972,000

.05 x ($334,934,000 + $132,972,000) = $23,395,000

Contingency:
A factor of 1% of the following contingencies were used.

Utility Relocation	$10,690,000
Traffic Control	$10,790,000
Drainage	$7,400,000
Bridges	$25,329,000
Removal of Structures	$0
Retaining Walls	$27,750,000
Pavement	$11,072,000
Enhancement	$0
	$93,031,000

.01 x $93,031,000 = $930,000

Reserve:
- Reserve is assumed to be 0%. $0

Engineering Fee

Allowance:
A factor of 25% of Base Cost ($334,934,000) plus the following allowances were used:

Utility Relocation	$10,690,000
Traffic Control	$19,170,000
Drainage	$3,000,000
Bridges	$46,551,000
Removal of Structures	$3,908,000
Retaining Walls	$21,038,000
Pavement	$26,208,000
Enhancement	$13,397,000
	$132,150,000

.25 x ($334,934,000 + $132,972,000) = $116,977,000

Contingency:
A factor of 25% of the following contingencies were used.

Utility Relocation	$10,690,000
Traffic Control	$10,790,000
Drainage	$7,400,000
Bridges	$25,329,000
Removal of Structures	$0
Retaining Walls	$27,750,000
Pavement	$11,072,000
Enhancement	$0
	$ 93,031,000

.25 x $93,031,000 = $23,258,000

Reserve
A factor of 25% of the following reserves were used.

Utility Relocation	$0
Traffic Control	$50,000,000
Drainage	$40,600,000
Bridges	$46,551,000
Removal of Structures	$1,037,000
Retaining Walls	$23,125,000
Pavement	$3,691,000
Enhancement	$ 6,699,000
	$171,700,000

.25 x $171,700,000 = $42,900,000